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THE
ARCHITECTURAL REVIEW
AND
AMERICAN
BUILDERS' JOURNAL.

VOL. II.

By SAMUEL SLOAN,
ARCHITECT.

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MONTHLY REVIEW.

INTRODUCTORY.

OUR SECOND VOLUME.

THE continuation of a work which has grown pleasant from acquaintance, is a far easier task than that which is encountered at the outset of an undertaking. In the latter case we enter on a speculative voyage with what confidence we can—yet, have we secret fears of unknown rocks and quicksands, and the possible loss of reckoning amid the gathering of frowning clouds across our course darkening our destiny. All these, with, for our dependence, but the trembling needle attracted by hope, and onward we must go or sink; for, there is no turning back.

It is thus that our first year's enterprise has been beset, if not in fact, at least in fears. But we have been successful, and now enter on our second volume with a confidence sustained by experience, and a determination to merit all the success we look for and are, so far, encouraged to win.

The ARCHITECTURAL REVIEW is intended for a national purpose and looks for national support. That this is well

understood seems to be evidenced in the wide spread welcome it has met with and is receiving up to the present time. Such encouragement ensures success, and thus a national want is likely to be fully met.

What we require is the confidence of all friends to the progress of ARCHITECTURE and BUILDING in America, and the assistance of every one who can render his pen useful in attracting thought on this great subject which we seek to develop. And in this we would be understood as asking not alone the aid of the scientific and theoretical, but of the practical and matter-of-fact men whose intimate interests are more especially involved.

We want the amateur, the student, and the hard-fisted mechanic, to avail themselves of our pages in giving and seeking information, and the architectural profession throughout the land to become known to each other, north, south, east and west, through the medium of the REVIEW. Information is

to be had of all these, and should be liberally exchanged; for, it is a narrow minded idea to retain, exclusively, knowledge that might be generally beneficial, and to sullenly refuse to give or to receive information. There are no architects of any experience who have not occasionally derived valuable practical hints from working-men—hints of uneducated genius. We will here give as a case in point the following anecdote.

On the occasion of the visit of King George the Fourth to the City of Dublin, in the year 1821, the Lord Mayor and Corporation resolved to give a banquet worthy of the royal visitor, but they had no hall which was deemed fitting for the occasion, and unfortunately the notice of his Majesty's intention to honor their city was exceedingly short. However, the government architect was commissioned to do the best he could under the circumstances, and he forthwith commenced a round room of considerable magnitude, in the rear of the Mayoralty House. The circular wall was run up of brick, with all speed, but, before the wall-plate was put on, it was found that the roof of such a span must necessarily thrust out such thin walling! A consultation of architects was called, but without effect. The best carpenters were taken into confidence in this dilemma; but to no avail. A handsome premium was offered for any practical method of meeting the pressing emergency—a blank pause ensued. At last a poor, miserable, drunken bricklayer, called at the fine private residence of the government architect, and, after some demur on the part of the liveried menial, was shown into the presence of that great man. The bricklayer made short work of the audience given him; for, before the architect had time to ask his business, he opened up an old umbrella with which he came provided, and sticking a nail into the handle immediately below the cylinder to which the braces of the ribs were attached, he broke off the handle below that point;

and, setting down his rudely improvised model on the floor, exclaimed in honest triumph "There's the way to roof your round room!"

The architect caught the hint and worked upon it. The round room was roofed, and, we regret to have to add, the well rewarded bricklayer never knew a sober day until he died.

Here then was an instance of a valuable lesson received from the most degenerate source, and one that came timely enough to save the professional reputation of a leading architect in the eyes of a king who prided himself on a knowledge of our art.

How many structures of importance have owed to beneficial advice, given by artizans, many of their best points of construction? And how many architects have had cause to feel thankful for valuable hints given them by workingmen.

Many a disaster is saved to a building by the practical good sense of those in the humblest garb. It is evident then, that all, from those of the highest mental attainments to those of the plainest practical ability, can benefit each other; and, if for such a purpose they will use our pages, the *ARCHITECTURAL REVIEW* will prove to be what it was intended for—the builder's friend, and disseminator of interchanged knowledge among all who are in any way interested in the progress of constructive architecture, civil or ecclesiastic.

In concluding these introductory remarks we take particular pleasure in promising our readers the valuable assistance of contributors to this volume, whose professional talents are the national pride, and whose labors to render our pages useful, cannot fail of success. In this we feel that one of the most desirable objects of our mission is likely to be effectually carried out, namely—the affording an opportunity to the architectural profession in the United States to disseminate knowledge which will benefit the great cause of *INFORMATION FOR THE PEOPLE.*

HOMES FOR THE PEOPLE.

CAPITALISTS do not seem to be aware of the potent power their wealth gives them of doing good. Yet, what inconceivable comfort a liberal aid to the worthy but needy millions composing the great working class of the nation would bestow.

The prime difficulty with this class is the want of ready means to create an independent home. The purchase of single lots is so disproportionate to that of tracts, that the man of humble means is made to pay from three to five hundred per cent. for being poor!

Everybody knows that land near cities is bought up by speculating capitalists and held until the demands of that city have raised its market value to a standard which ought to be sufficient for the most avaricious; but which is not the end of the capitalist's dream. No, he now cuts his tract up into streets and well pinched lots, on which he sets a price, per foot frontage, that will make him a millionaire whilst it excludes the man who needs a home from any chance whatever of buying, unless he can borrow at usurious rates, and instead of becoming an independent householder, draws inevitable ruin on himself and family.

How much better would it be for society at large if capitalists would in their goodness of heart, reduce the price of their single lots to a figure that would leave them ten or even twelve per cent. on their total outlay, and thus give a chance to the class we speak of to be partakers in the free home privilege.

And how much better would it be if they would also build up blocks of *skeleton houses*, each house to be finished as a purchaser was found, or even to sell these skeletons, and let the purchaser finish to suit himself. But in all cases to set down the price so as to admit of justice being done the poorer

man, and at the same time a reasonable profit paid to the capitalist.

Mr. Peabody and Mr. A. T. Stewart, have turned surplus capital to a benevolent account in the erection of immense tenement blocks, but these, though very desirable as affording a comfortable shelter to those who knew not what cheap comfort was before, do not confer on the citizen that independence he looks for—the being “king of his own castle.” Those furnished tenement buildings are at best but hospitals for the preservation of health, and a sanitary protection to cities such as London and New York. They are a desirable boon almost amounting to a *charity*. What we seek is a *concession* from capital to society, by enabling a worthy class to raise themselves in the social scale, and by this enlarge the brotherhood of man, binding in bonds of gratitude the benefitted to the benefactor, and rendering the capitalist a person to be esteemed for the power he exercises so usefully, rather than a wretch who hordes his savings viciously and withholds them from his fellows while he can.

“*Miser ille est qui numos admirator*,” said the truthful Roman of old, and the brand is as strongly affixed to the money-grubber now as it was then.

There is always much to be expected from the many. Misers are the exceptions in society. It is then in the power of the generous many to compete with the avaricious few, by combination of means, the purchase of tracts near cities, the laying out suitably of streets, and the liberal yet judicious apportionment of lots—and the affixing of prices and terms of payment, so reasonable as to suit the convenience and ability of those who most require this help to independence.

Building Societies are growing more

numerous every year. A certain sign of the necessity there exists for the assistance we speak of. Many, if not most of these societies will inevitably fail; for the simple reason that they are founded on weakness itself. No association of saving working-men can effect a purpose that is within the reach of ready capital alone. And if there was any hope of success it must arise from unanimity of purpose and aggregation of savings. Whereas, not one of these societies can fill up its subscription list, and the constantly increasing number of them as constantly diminishes the already faint chance of effecting the end that all have so anxiously in view. No, CAPITAL can alone carry out this grand idea, and in so doing the associate capitalists will render a philanthropic service to society which cannot be fully appreciated by even the most enthusiastic.

We do not desire to impugn the motives of those of the working classes who are now laboring in our large cities to establish Building Societies; but we doubt the good sense of such efforts, where nothing short of full ranks can give even a prospect of success. Where is the use of proceeding, or trying to proceed with a mere handful? If it require five hundred let no attempt be made to work upon anything short of that number of subscriptions in cash. It is foolish, if not actually wicked to lead hard working men on by baseless calculations to a certain disappointment and loss. Await the completion of the plan before you commence to rear the edifice. This is nothing more than prudence, and it would be well to watch and check those *fast actuaries* in Building Societies, who strive to force by inflation, and too surely burst the mere bubble.

NATIVE COLORED MARBLE.

THE recent opening of an extensive quarry on Lake Champlain puts this country in possession of the most varied and beautiful colored marble in the world. We have some specimens of its different tints and rare varieties which will challenge rivalry.

The history of Marble is very interesting and embraces a large number of sorts each peculiar in itself. Of the antiques we have *The Parian*, the finest of all statuary marble, is the product of Greece. Its surface is very smooth and it is grained in large scales.

The *Greco Turchinocchio* or *Tyrium*, is a bluish marble seldom to be met, but once very much used.

The *Marmo Antico* is of a brownish red or liver color, covered with minute black crooked lines, a species of network. It is occasionally remarkable for white blotches, with sometimes livid white veins.

Marmo Noro Antico has a deep black color. It is of a very fine texture marked here and there with minute white, short, straight lines, but always broken and interrupted.

Marmo Cippolino. The general color of this marble is bright green on a yellow ground; or sometimes black on a white ground, and occasionally blended with a ground of yellow.

It is very rarely met with.

Marmor Numidicum, or *Giallo Antico*, has an exceedingly fine grain, and a yellow ground. The tints vary very much. The more dark the more valuable the marble. It has been compared by ancient writers to many different objects, such as ivory grown yellow with age, the golden rays of the sun, saffron, &c. Sometimes it displays a purple line, and sometimes the lightest possible shade of yellow, some as bright as gold, styled *Giallo Dorato*, others

orange, and named *Giallo Capo*, and others again, exceedingly rare, are of the color of a canary bird and known as *Giallo Paglia*; finally, another of a reddish tint called *Carnagione*, very beautiful and highly valuable when the color (which is sometimes the effect of fire) is natural.

Marmo Luneuse, or as it is more generally known *Carrara*, ranks next to Parian, than which its color is more soapy, containing occasionally dark and apparently metallic blotches. The quarries near Lima, a town in Tuscany, on the Confines of Liguria, were worked in the time of Julius Cæsar, and the marble is not in the least different from the Carrara of the present day.

The modern colored marbles are few, the richest and largest of these being Irish, and it has been stated in the *Builder*, from which we derive our information, that "it is very doubtful if the ancients quarried blocks of black marble of such large size as are imported into London from Galway." The red, the yellow, and the green as well as black of the quarries of the Emerald Isle, viz : Kilkenney, Connemara, and Galway are certainly very beautiful and are not unfrequently imported into this country for decorative construction as well as for cabinet-work.

The *Statuary Marble* is white, and of the same quality as that used in the time of Julius Cæsar. The texture is eminently beautiful—close and fine-grained, and in color white as snow. When it is perfectly pure the value is very great. But this occurs so rarely that any price is paid for an opened block, so that the quality may be seen.

Veined marble is also white and the texture is much like that of statuary marble. It is close-grained and streaked with blue and black marks.

Sicilian or *Bianca Chiara*. This marble was comparatively unknown in England until introduced there by Sir Francis Chantrey, the eminent sculptor, from whom it received the name of "Sicilian," though it is really a Tuscan

product. The ground of this marble is generally of a bluer cast than the veined marble, having *dots* instead of *streaks* of blue and black.

Porte Venere, or *Black and Gold Marble*, is a very beautiful article, having veins of gold or yellow, variegated all over it. The brilliant gold-like color has caused it to be highly esteemed, and given it its English name.

Dove Marble is, as its name implies, of that peculiar color, marked with white blotches. The texture is close and very fine.

Bardiglia Marble is like "Dove," but more decidedly marked with either a faint blue streak, or in some and more valuable kinds the color approaches almost a black on its dove-ground.

Sienna Marble is very similar to "*Giallo Antico*," already described among the antiques, particularly in texture, and occasionally in color. It is highly and very deservedly esteemed, and varies as much as the *Giallo Antico* referred to.

In the United States we are acquainted with many of these marbles as used in our necropolises. Our Capitol at Washington and several State-houses and other public structures throughout the Union, in statuary, paneling, balusters, &c.

But colored marbles are scarce, the Sienna being the only actually colored marble, all the rest being at best but faintly tinted or black.

The Irish marble then is the only colored marble now to be had in Europe in large blocks and in quantity.

Here in the United States we have a good quality of white building marble which answers a very good purpose, and a very limited quantity of statuary from quarries in Vermont; but the finest of which is growing scarce, and now have the pleasure to supplement it with the beautiful colored marble of the Lake Champlain quarry of which we set out to speak, and the future history of which may safely be predicted by all

who look upon the polished samples of its rare combination and beauty of colors.

This Lake Champlain Marble is so uniformly hard in its grain that this characteristic alone gives it a vast advantage over the generality of colored marbles, which are but too liable to have soft veins of chalk demarking their shades of color or outline of pattern.

The boon this new quarry presents to our country can only be estimated through the consideration of the very great value set by ancients and moderns on the colored marbles; and to form an adequate idea of the scarcity of the article, we have only to recall the fact of the welcomed invention and very

general introduction of *Scagliola* in Europe, which, beautiful as it must be acknowledged to be, is nevertheless but an imitation—bearing no more value in proportion to the natural marble, than electro-gilt does to pure gold. And yet, for want of the real article this perishable substitute, this plaster mockery, is to be found adorning some of the finest interiors (for it would not stand the open air) in Europe.

We love realities in this country, and will have them in preference to “make-believes,” however admirable they may be. It is therefore a source of gratulation, the revealing of this Lake Champlain Colored Marble, which adds a brilliant art-item to the rich chronicle of our national mineral discoveries.

AMERICAN ELASTICITY.

MR. RUSKIN in some of his poetic prose disquisitions on the Mediaeval style deplores the too general tendency just now in Europe to the eradication of the good old fashion of building, by the tearing down of those relics of former days which gave such a solemn aspect of grave dignity to the quaint old streets of Paris and London, and he glances rather contemptuously at the bright novelties which Napoleon III has introduced into his Capitol *vice* the grim inconveniences the Emperor has so peremptorily removed.

But let Mr. RUSKIN be heard. He says:

“And when the formal street, in all its pride of perfumery and confectionery has successfully consumed its way through the wrecks of historical monuments, and consummated its symmetry in the ruin of all that once prompted to reflection or pleaded for regard, the whitened city is praised for its splendor, and the exulting inhabitants for their patriotism—patriotism which consists

in insulting their fathers with forgetfulness and surrounding their children with temptation.

“Is this verily the end at which we aim, and will the mission of the age have been then only accomplished when the last castle has fallen from our rocks, the last cloisters faded from our valleys, the last streets, in which the dead have dwelt been effaced from our cities, and regenerated society is left in luxurious possession of towns composed only of bright saloons, overlooking gay parterres? If this be indeed our end, yet why must it be so laboriously accomplished? And are there no new countries on the earth, as yet uncrowned by thorns of cathedral spires, untormented by the consciousness of a past? Must this little Europe—this corner of our globe, gilded with the blood of old battles, and gray with the temples of old pieties—this narrow piece of the world’s pavement, worn down by so many pilgrims’ feet—be utterly swept and garnished for the mask of the future?

Is America not wide enough for the elasticities of our humanity? Asia not rich enough for its pride? or among the quiet meadow lands and solitary hills of the old land, is there not yet room enough for the spreadings of power or the indulgences of magnificence, without founding all glory upon ruin, and prefacing all progress with obliteration?"

Yes, America *is* wide enough for the elasticities of European humanity and is constantly proving the fact. If old Europe is tired of looking on the fossils of mouldering ages—young America is determined not to have any to groan over; for, she gets rid of her constructions as quickly as she can improve upon them, and feels not the slightest

pang as a gray-beard building is cleared away to make room for the "coming style." Scarcely has a generation time to shuffle itself off ere every vestige of its builded works either go after it or if retained are so altered in appearance as to defy identification by their constructors. America is truly elastic—very progressively so—and will not waste time meditating on the past when there is so much more profit to be looked for in the future. This elasticity is the main-spring of our action, the secret that causes us to lead old Europe in the great race of life; and it must control our destiny—for we surely have a territory large enough to require all the living energy of a nation that looks not back.

THE GROWTH OF NEW YORK.

IF the slow, solemn, pipe-smoking denizens of New Amsterdam could look upon the city of Manhattan to-day, how great would their astonishment be to find the "country parts" that were north of Wall street, where their mural line of defence stood in the drowsy old days of Ten Breeches, now turned into a wilderness of masonry and a human hive of humming industry. Nay, if those of New York's far more recent days could arise again and look abroad upon the gigantic strides of progress which have left the "lower end of town" so far behind that it is quite a stretch of imagination for the up-town ten to guess where it is, how sad would be their feelings to think that things are so fleeting that memory is sorely taxed to keep the track of them. "Central" was at one time deemed an outlandish name for that beautiful creation of art founded on rocky nature—the Park; but now the name is suitable, for every day that spot becomes more central, and a very few years will fix it as the true point from which to measure

equally north and south this empire city of the East.

Brown stone blocks, now and then choicely interspersed with white marble, are looming up in palatial display everywhere. Unlike our Philadelphia, the residential portion of the city keeps the business portion at a dignified distance, and so wide is that distance threatening to extend that it has actually become imperatively necessary for the business to take up a well advanced position to keep within reach.

Union Square, once the home of the merchant princes and millionaires, is now alive with business marts and bazaars of bewildering fashion. Churches are torn down to erect upon their sites stores for the demands of luxury and (shall we say?) vanity.

Those whilom sacred edifices are being metamorphosed into theatres, and in fact progress in New York seems disposed to turn everything into something else; and all for the sake of change, untiring change. Nor is this perpetual

May movement at all likely to abate. On the contrary, the completion of the Pacific Railroad will add to the vigor of its motions, and the Harlem river may yet be the centre of the ambitious city, and the Central Park be the Southern Park, occupying the same relationship to the centre that the Bowling Green (once itself the centre) does now.

In fact, we cannot dream visions of future greatness fast enough; for, the fastness of the times will wake us up to their realization, and our own bewilderment ere the visions are complete. We even expect, some day, (not distant, it is to be hoped,) that New York will actually have respectable markets.

We feel a national pride in this grand march of our prospering sister city, and do not wish for, nor expect, a limit to its advance; for, it goes to make a chapter in the great history of the progress of man, and the unobstructable course of intellectual enlightenment and responsibility of government, which bear forward our nation to a glorious destiny.

DESIRABLE WATER-PIPES.

WE have been favored with a pamphlet from the American Tube Works, at Boston, a perusal of which leads us on to the consideration of a subject which deeply concerns the health of every community—namely, the general use of lead-pipes for the keeping or remission of water and drinks of various sorts.

That lead is a most pernicious vehicle has, on the fairest chemical investigation, been proven beyond possibility of doubt. Yet it is generally used still by our householders, and will continue to be the public water-carrier for an indefinite time in the future, unless science and art combine to drive it from its strong-hold by the substitution of another and in every way equal conveyancer.

Besides the positive poison which lead imparts to water, and to other liquids, there is a serious objection to that metal

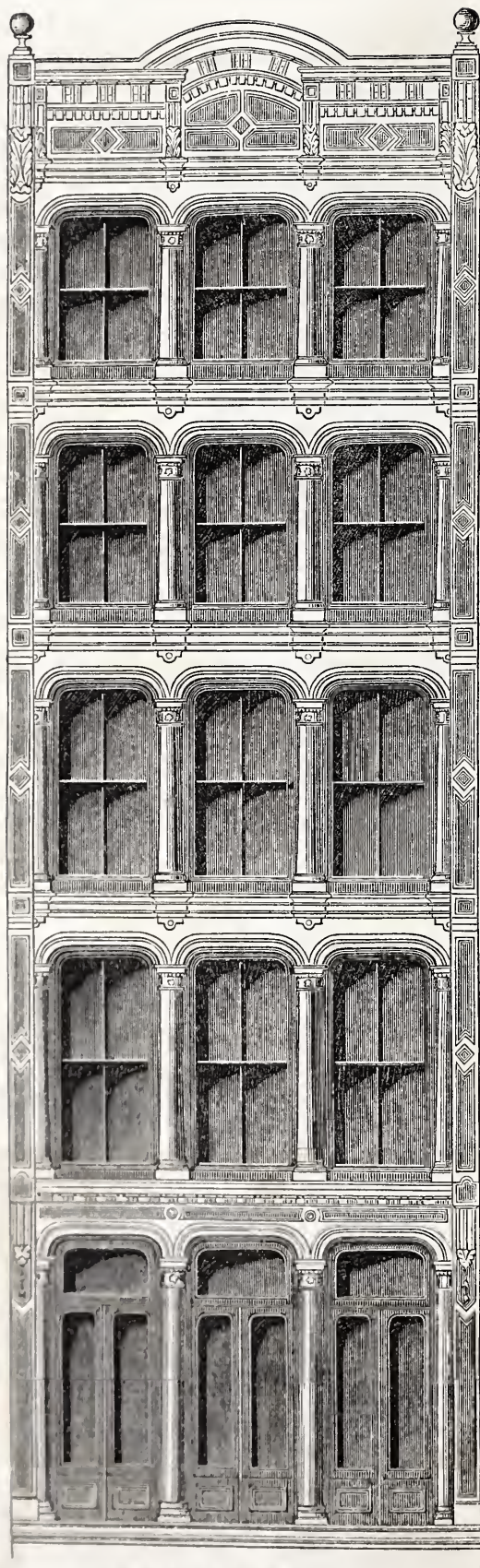
on the score of its expansive tendency, for under the pressure of a passing fluid a pipe made of it will swell to such an extent as to grow thin enough to burst. And it never contracts like other metals but lengthens under the pressure and gets out of shape. This is the case when the water is cold, it is still more annoyingly so when the water is hot.

Lead is also a heavy metal, its specific gravity being 11.352, or to speak more practically, a cubic foot of cast lead will weigh 709½ lbs. This weight of course demands a proportionate support for a long horizontal pipe which holds in addition the weight of its capacity of water.

The Boston Tube Works Company propose to entirely supercede lead for the purpose to which it has so long been applied and have manufactured accordingly a seamless drawn tube of brass, which at once does away with the trouble arising from expansion under pressure, and also obviates the necessity for brazing or soldering of joints, as these tubes are screwed together. Nor does this seamless drawn brass tubing require as much support as lead pipe; for, while the latter, as we have already observed, weighs 709½ lbs. to the cubic foot, brass will weigh but 488¾ lbs. A very decided advantage where much length of tube or pipe is required to be supported.

But besides the superiority which brass tubes of this manufacture possess over lead pipe in a sanitary respect, which is after all the most valuable item of character, the brass tubing is unquestionably *cheaper*, and is always more readily repaired or adjusted, being connected by means of couplings similar in plan to those used for gas pipes, and affording every facility for elbows, branches, faucets, and all attachments.

PLUMBING will have to relinquish the water-pipe specialty at no distant day, for we clearly see the superiority of brass over lead in this seamless drawn brass tubing which, unless some still better agent offers, is sure to be popular, because in so many respects satisfactory.



IRON STORE-FRONTS. No. IV.

By WM. J. FRYER, JR., WITH MESSRS. J. J. JACKSON & BROS.,
NEW YORK.

DESCRIPTIONS.

IRON STORE-FRONTS.

No. 4.

WE here present No IV of the designs of Mr. WM. J. FRYER, Jr., for store fronts to be executed in iron. There is in this composition a pleasing characteristic unity which commends it to the eye in an especial degree. It is at the same time a fair example of the capability of that peculiar material for the production of effect without much extra outlay of money.

WORKINGMEN'S COTTAGES.

THE interest in the comfort of that vast portion of every community which is distinctively entitled the "working-men," is growing greater in this country and in Europe, and calls for all the inventive and suggestive aid which science, prompted by philanthropy, can bring to bear upon it.

The citizen who claims to belong to this class, with us, is not to be put off with such shabby contrivances as the hard worked, ill-paid toilers of the more aristocratic continent.

We take a pride in seeing our working-men occupying their true position as respectable citizens, the main bulwark

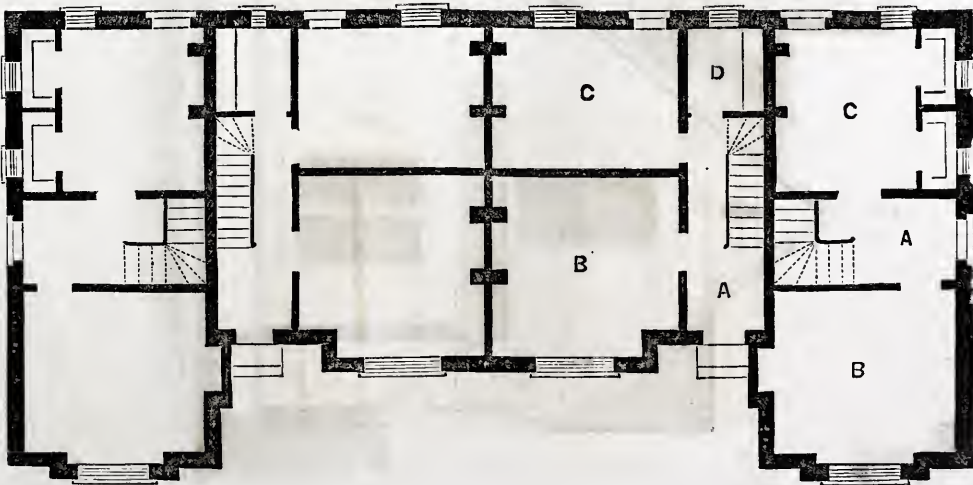
of our nation, on whose skill and cunning handicraft depends our character as a commercial competitor in the wide world's market.

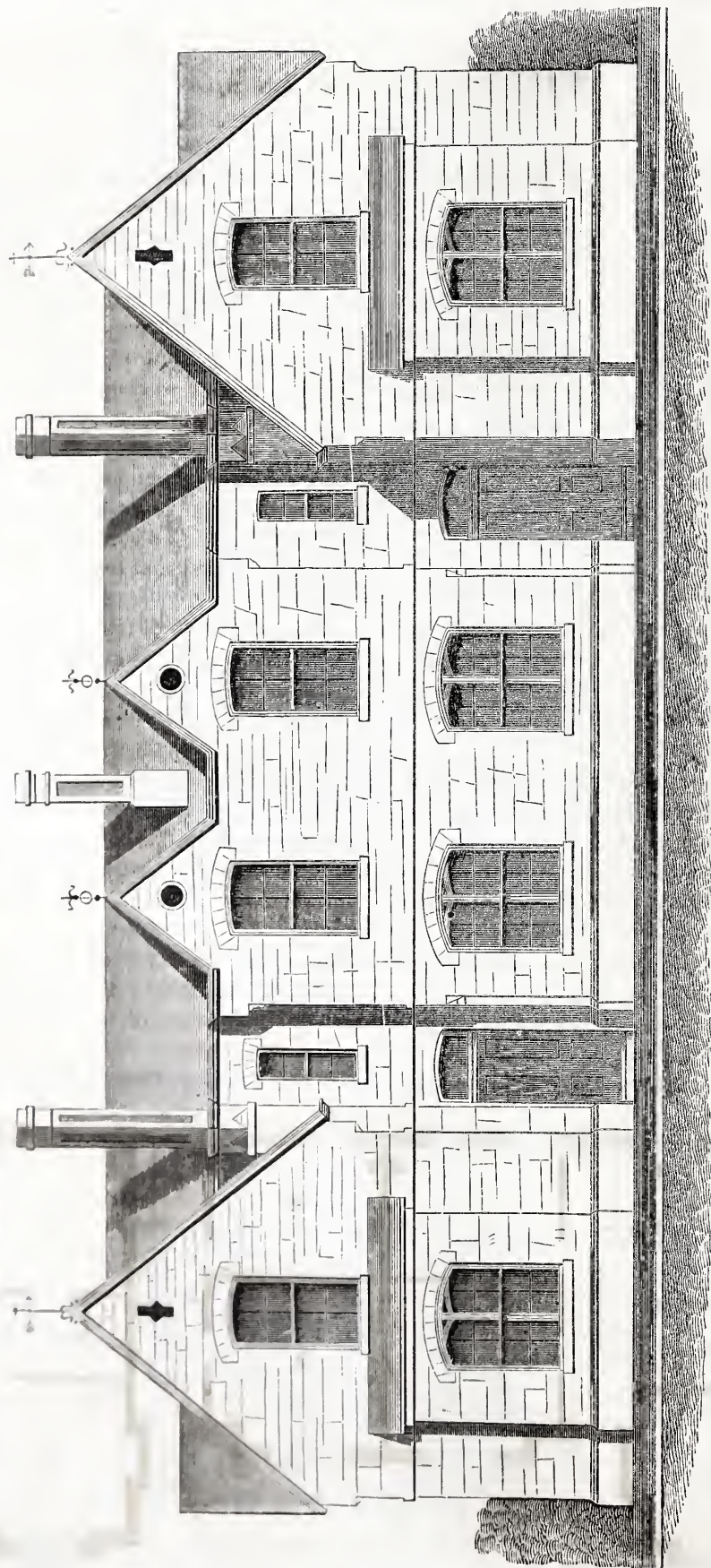
First amongst the requirements of respectability is "home comfort," and the main feature of that is suitability of dwelling for the working-man's family. Without a comfortable dwelling good clothing fails of half its desirableness. It is, to a certain extent, a false appearance, as it conveys to the community the impression of a suitable home from whence such personal comfort naturally comes.

The appearance of our working-men's homes is something that the community in which they have their location is concerned, for such appearance is certainly a prominent feature, forming the character of such community. If these homes of the artisans are tasteful as well as comfortable, the fact is patent that the dwellers therein are well paid, and that trade flourishes in that community.

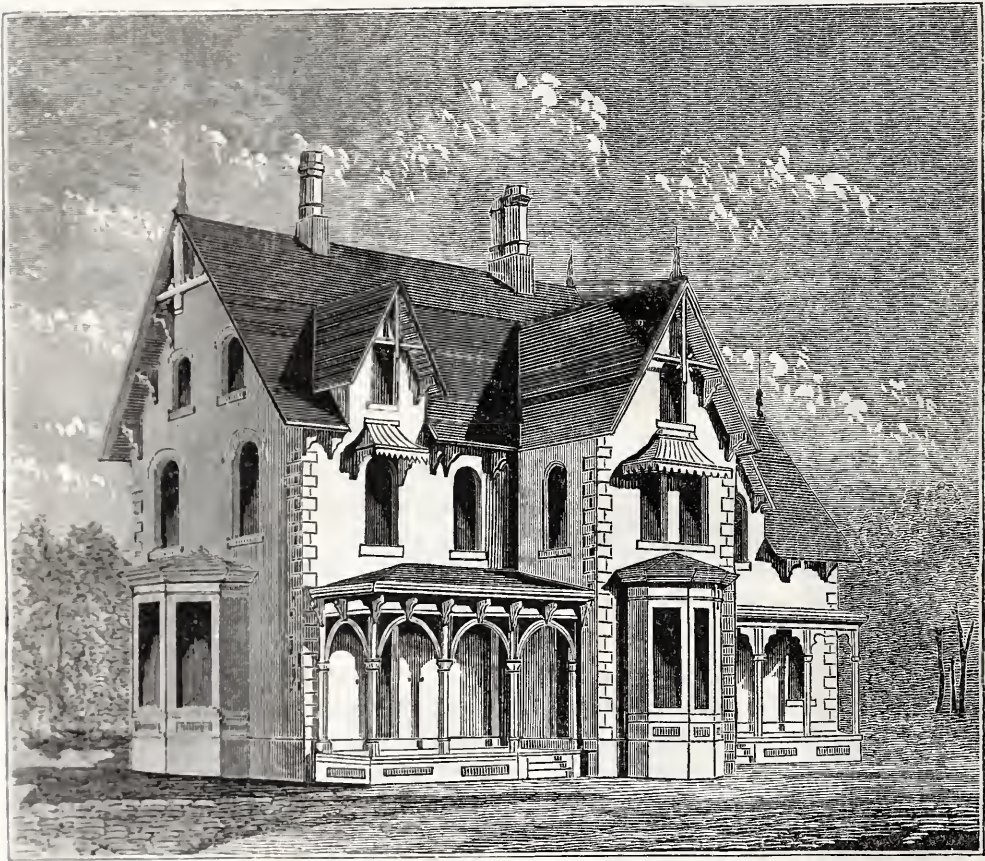
Thus the character of the working-men's homes reflects the character of their locality and all in any way connected with them.

It will be seen then that the proper





WORKINGMEN'S COTTAGES.



No. I.



TWO VILLAS

DESIGNED BY THOMAS L. CERNEA, ARCHITECT, PHILADELPHIA.

construction of working-men's cottages is as much a matter of actual policy with any community as of philanthropy, and he who will not think of it in the one sense will surely attend to it in the other.

The plans here given show four cottages; two of one form, and two of another, but it will be seen that they (as far as dimension of rooms is concerned) are the same. A, the Hall. B, Parlor. C, Kitchen. D, Pantry.

There are two good chambers, and two small sleeping rooms, on the second floor.

Cellars and attics can be added or not, according to outlay. Of course both would be desirable.

The elevation of these working-men's dwellings shows a very good effect of light and shade and the breaking up of outline is productive of a pleasing feeling.

TWO VILLAS.

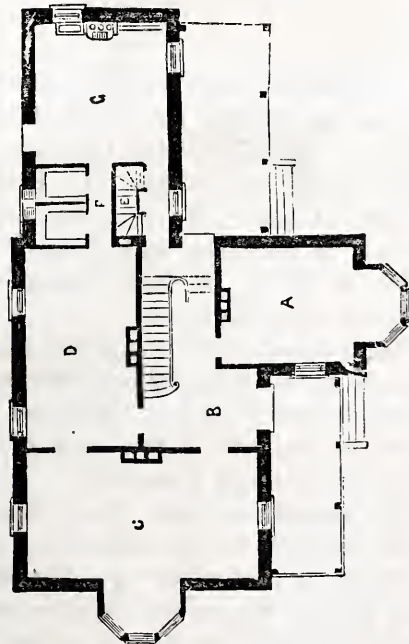
THE accompanying illustrations present two suburban villas calculated to combine internal comfort and external effect; a union that is always to be wished for, yet, in sadness be it said, seldom, too seldom to be met with. The one is, as a general thing, sacrificed to the other, and the residence which charms the eye of the outside observer is sensitively felt by the occupants to be too inconvenient to be comfortable. In such cases the unhappy resident has but the one offset against dissatisfaction, and that is the gratification of external display. Yet, this is but poor comfort, and can go but a little way towards ameliorating the condition of things; being apt to generate a feeling of jealousy of the outside world for whose transient admiration the sufferer has to bear a builded fate.

The two Villas now under consideration are happily exempt from the evil just referred to, and in fact each, though widely differing from the other, is re-

markable for a good disposition of rooms and access to them. Each well lighted and thoroughly ventilated, with the chimney so centrally situated as to secure and economize the greatest amount of heat possible; as well as to avoid the outer display of obtrusiveness so offensive in some designs, which make the chimney instead of a serviceable subordinate, a leading feature or chief characteristic of the composition, as though the house was an adjunct to the chimney instead of the latter being subservient to the house.

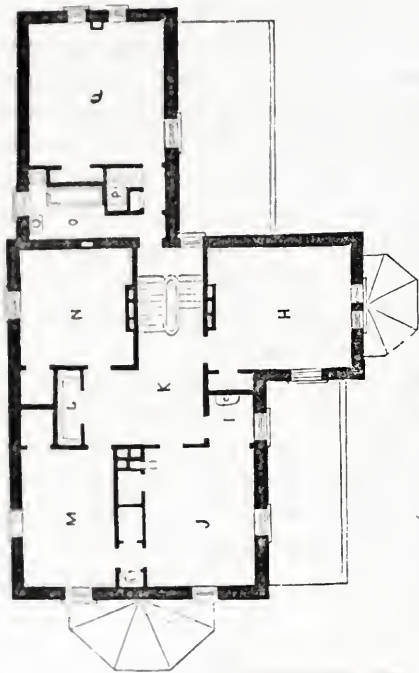
The style of the first, or upper one, is mixed, but has notwithstanding its want of special character a very pleasing effect; and, whether in the suburbs or the country, would ensure attention as a tasteful composition.

We will now proceed to describe the plans.



The above is the principal or ground floor, consisting of A, the Parlor, with a large bay window. B, the Hall and chief Staircase, with a door under it leading to the back stairs. C, the Drawing Room, with a spacious bay window. D, the Dining Room. E, the Back Stairs. F, Pantries. G, the Kitchen.

The second story is arranged thus:



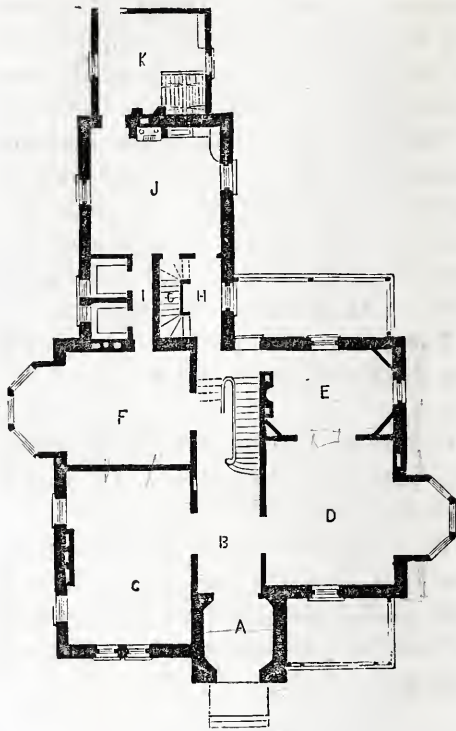
H, Chamber, with Clothes Closet. I, a Dressing Room, with fixed Wash-basin. J, Chamber, with Closets. K, Upper Hall and landing. L, House-keeper's Closet. M, Chamber, with Closet. N, Chamber, with Closet. O, Bath and W. C. P, Back Stairs. Q, Servants' Sleeping room.

There are also attic rooms which add much to the accommodation of this residence as well as giving additional interest in the bold Gothic pitch of the roof with its ample dormers.

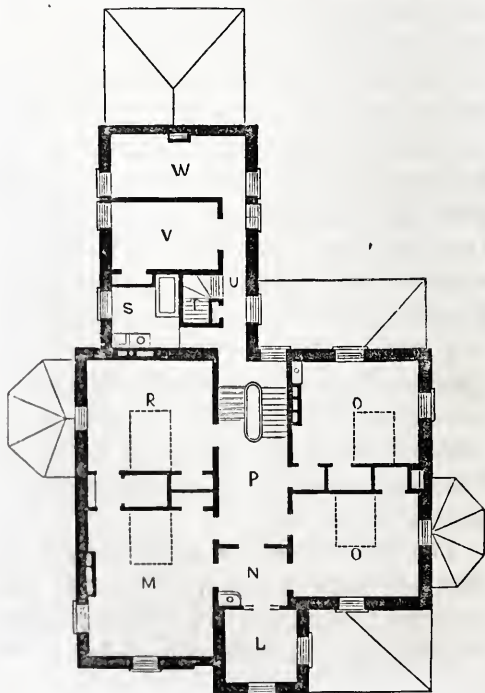
The second, or lower illustration, is more distinct in its character; the French style predominating. The Mansard roof, of the curved form, is sufficiently lofty to give dignity to the design, and the dormers tend to relieve the extensive roof-surface. The tower is a great set-off to the building, and, with its lofty pyramidal covering adds much to the design.

The porch and veranda are alike calculated to relieve the solidity of the whole and present a light and pleasing appearance.

The Plan of this Villa is as follows:



A, Vestibule. B, Hall and principal Staircase. C, Parlor. D, Dining Room, with capacious bay window, and sliding doors dividing it from E, the Library; an octagonal room. F, the Dining Room, with bay window. G, the Back Stairs. H, Passage. I, Pantries. J, Kitchen. K, Wood-house, with trap-door to cellar.





OUR WATERING PLACES - ATLANTIC CITY.

The Plan of the Second story is, L, A Study, or Ladies' Boudoir. M, Chamber, with Closets. N, a Vestibule, with Wash-basin. O, Chamber, with Closet. P, Upper Hall and landing. Q, Chamber, with Closet. R, Chamber, with Closet. S, Bath and W. C. T, Back Stairs. U, Passage. V, Housekeeper's Room, with Closet. W, Servants' Room.

The lofty roof affords an ample accommodation in attics well lighted and ventilated.

Both of these Villas are worthy of attention as being highly desirable as residences as well as for elegant accessories to any good locality. They were designed by Mr. THOMAS L. CERNEA, a rising young architect of this city, whose early studies we had the pleasure to direct, and in whose success in his profession we take a warm interest.

OUR SEA-BATHING RESORTS.

ATLANTIC CITY is situated on the northern part of Absecon Beach, in the State of New Jersey, about forty miles north of Cape May. The location is on an island nine miles long by half a mile wide, formed by an arm of the sea, which is about a quarter of a mile in width, opposite the city, and is navigable through its entire length for schooners of large size. The distance from the main land is six miles, the intervening area being salt meadow. It lies southeast from Philadelphia sixty miles, with which it is connected by the Camden and Atlantic Railroad, over which five through trains pass, each way, daily during the summer.

The development of this sea-bathing resort has been remarkable. When the first train ran through, on July 4th, 1854, the island was but a succession of hills from ten to thirty feet in height formed by the wind-driven sand of the beach, caught by and piled around the

trees and shrubbery, which covered the surface.

There were then but three small houses on it. Now there is a city, some two miles in length, with wide avenues regularly laid out, gravelled and graded, and built up with hotels and cottages, arranged with great taste and beauty. The hotels alone, will accommodate about ten thousand boarders, and though distributed through nearly the entire length of the city, passengers are landed from the cars within two squares of the one most remote. The time from Philadelphia is but *two* hours, and when we consider its convenience of access, the admirable arrangements for landing passengers, its great extent of bathing ground, and the fact that being so far from the main land (as it is entirely surrounded by the sea) the atmosphere is peculiarly dry, we can readily account for its rapid development. But in addition to the usual business of such sea-side resorts, its convenience of access to Philadelphia and adjacent cities, and the short time required to reach it, has led to the development of an extraordinary excursion business. A train of this kind is run nearly every secular day in July and August. These trains are engaged by various organizations, and carry from five hundred to two thousand persons; as high as *three thousand* were carried on one occasion. The increase of this business has led the Company to erect the large and tasteful hotel, represented in the plan accompanying this article, for its special accommodation.

Those who projected and built the railroad and laid the foundation for the city deserve well of their fellows—though doubtless they built more judiciously than they were aware, for the most enthusiastic could have hardly foreseen the great and growing demand for sea-side recreation—nor have appreciated the great blessing they were preparing for those who cannot give up their business and retire from the city.

for days or weeks together, during the hot months of July, August and September.

The Building has a frontage on the ocean and also on the railroad, of about 200 feet, with a spacious covered verandah on each front, wide halls, passages, and other appendages, capable of accommodating the very largest excursion parties.

A, Main entrance Hall, 15 feet wide.

B and C, The Ball and Dining Rooms, measure together 76 by 130 feet, separated, longitudinally, by a series of wide open rustic arch-ways, paneled wooden screens fill up, in part, these openings, to be removed when required; or to be used together. This portion is one story high, being 22 feet from floor to eave.

D, A general Reception room, 36 feet square, with clerk's desk, and accommodations for storing clothing and parcels.

E, Restaurant, 16 by 50 feet; separated from the Dining Room by arch-ways corresponding with those dividing the Ball and Dining Rooms.

F, Restaurant Kitchen.

G, Bar Room, 36 feet square.

H, I, Wash-rooms and Water Closets.

K, Bowling alley, 35 by 85 feet, with Lobby on one side.

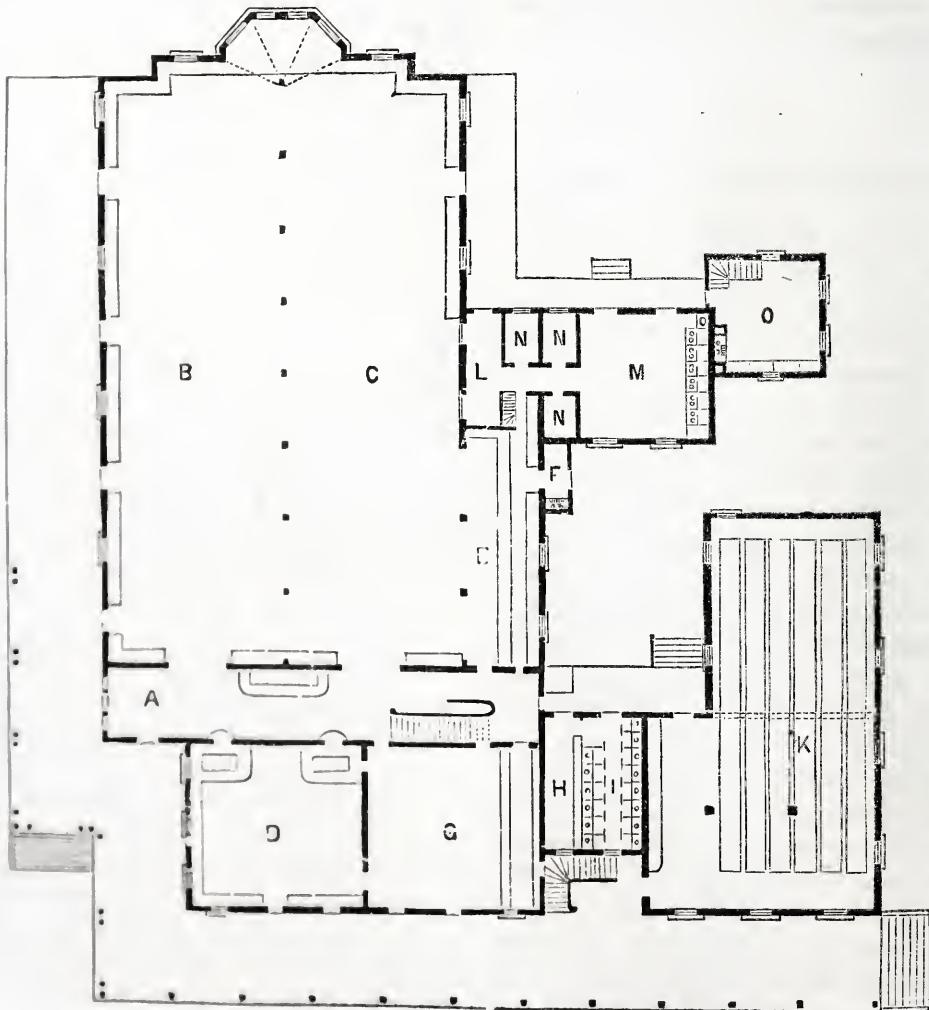
L, Carving Room.

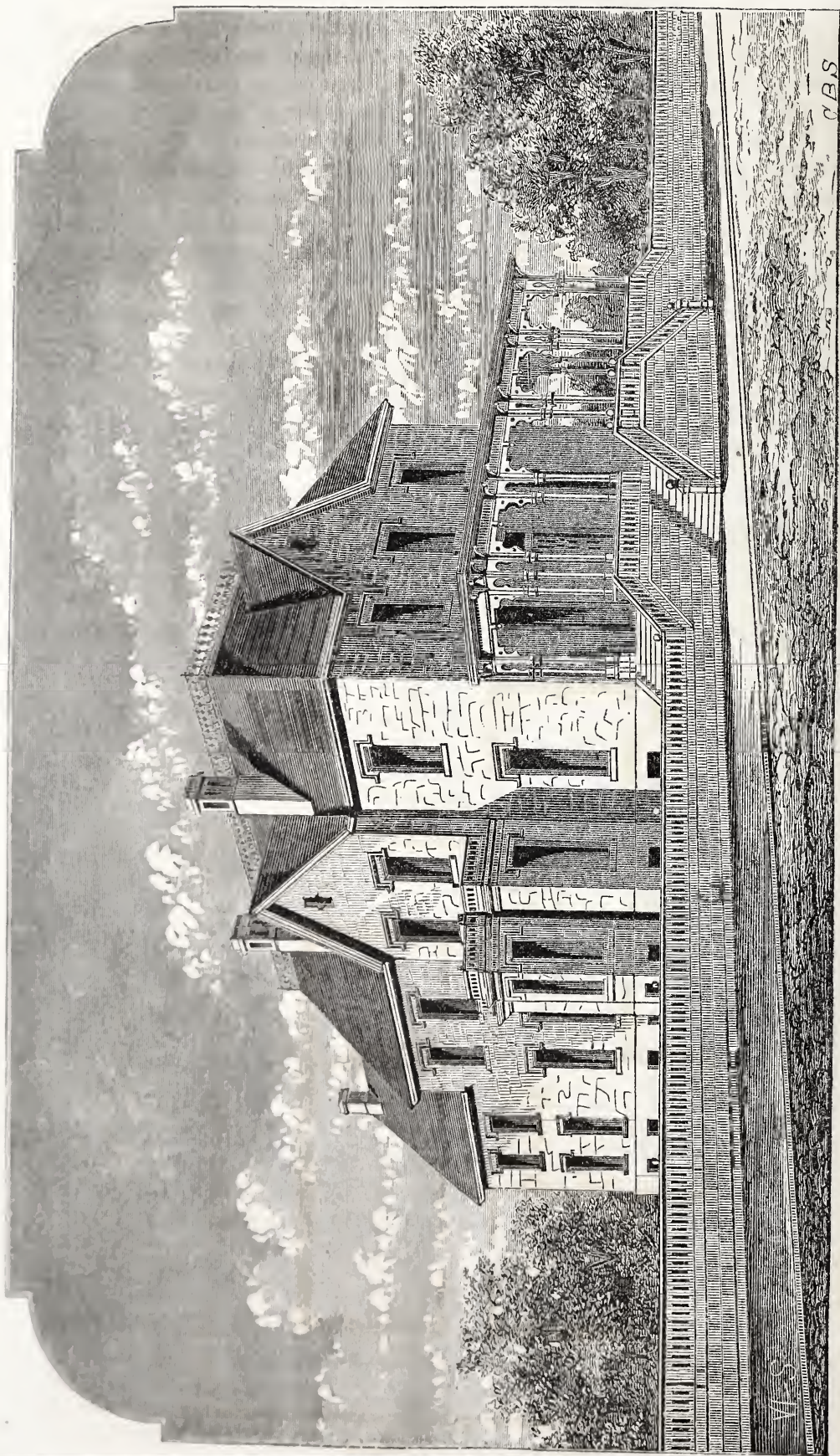
M, Main Kitchen.

N, N, N, Dish and Store Rooms.

O, Laundry.

There is a Cellar under the Kitchen with large permanent refrigerator; and another Cellar under the Bar Room, with convenient access to both.





A COUNTRY RESIDENCE.

The Second floor contains a large Ladies' Parlor, Private Dining Room, large Billiard Room, in part over the Bowling alley. The same accommodations of Wash-rooms and Water Closets as are on the first floor, several fine Chambers and spacious Halls, from which access is had to the second floor veranda.

Third floor, and second over the Kitchen and Laundry, is appropriated for Sleeping Rooms. An ample supply of good water is provided. Gas is introduced all over the building, and all other conveniences to ensure the comfort of a large number of guests upon the shortest notice.

A COUNTRY RESIDENCE.

THE perspective on the accompanying page represents a first-class country residence. It is raised, to ad-

mit of a stone terrace seven feet high approached by a double flight of steps and enclosed by a pierced balluster; three sides having a piazza.

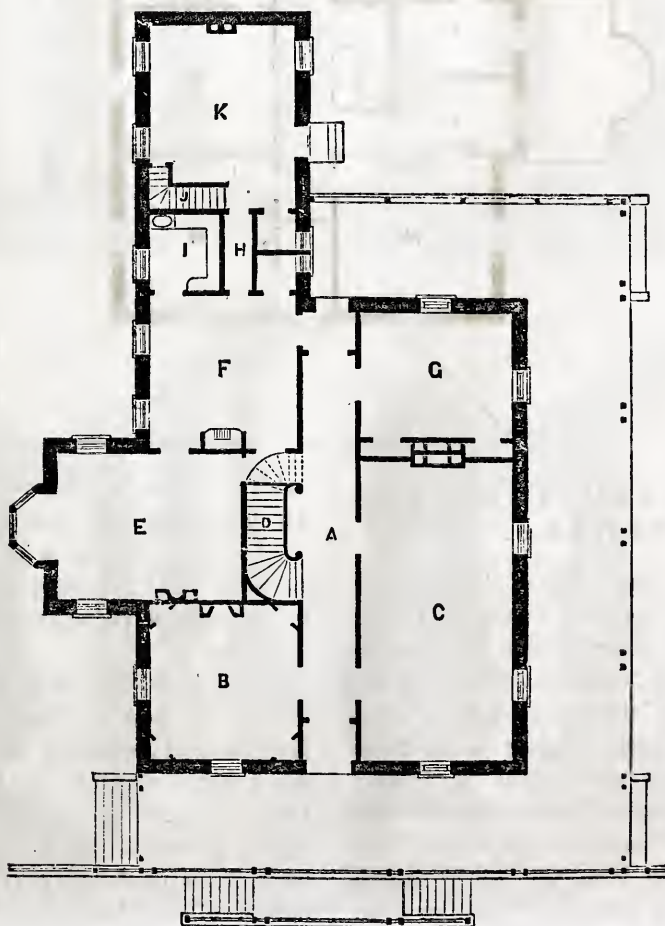
The main building is forty-six feet front by sixty-five feet deep, not including ten feet projection of Parlor in addition to width of front.

The Kitchen Wing is thirty feet long by eighteen feet wide, and, like the main building, is two stories, though not of the same height as it is.

A Cellar seven feet high extends throughout the whole building.

The plan of this dwelling is thus arranged:

A, The Hall. B, Study and Library. C, Drawing Room. D, Principal Staircase, under which is the entrance to E, Parlor. F, Dining Room. G, Breakfast Parlor. H, Pantries. I, Butler's Pantry. J, Back Stairs. K, Kitchen.

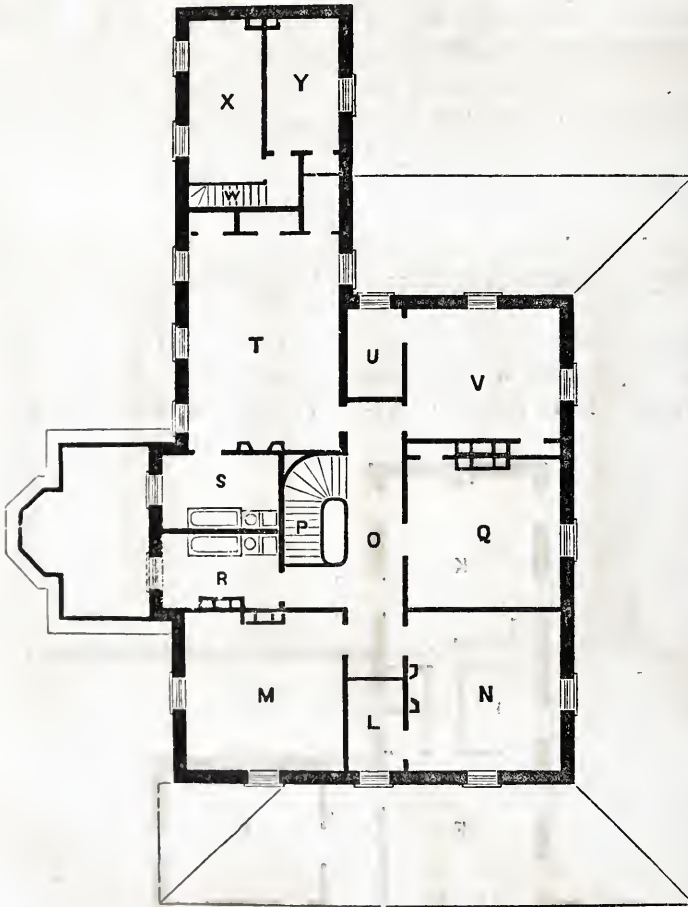


This Second story is laid out with great comfort and convenience.

L, Dressing Room. M, Chamber. N, Chamber. O, Hall. P, Staircase. Q, Chamber. R, Bath and W. C. S, Bath and W. C. T, Nursery, with Closets. U, Dressing Room. V, Chamber. W, Back Stairs. X, Servant's Room. Y, Housekeeper's Room.

The roof forms on top a platform enclosed with an ornamental iron balustrade, making a very delightful place for promenade and observation.

With no pretension to architectural style, this country residence presents a most pleasing appearance externally, and gives elegant accommodation to a large family.



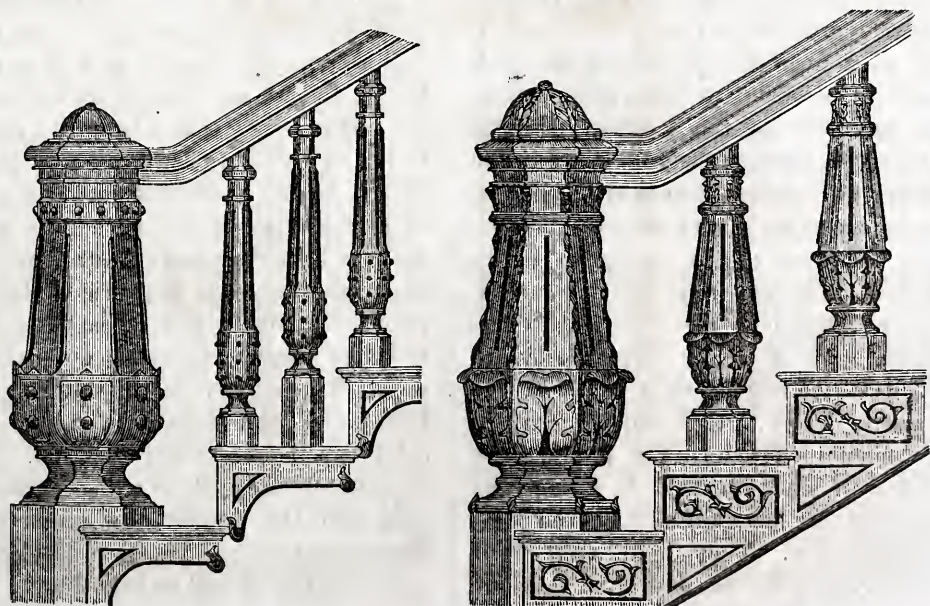
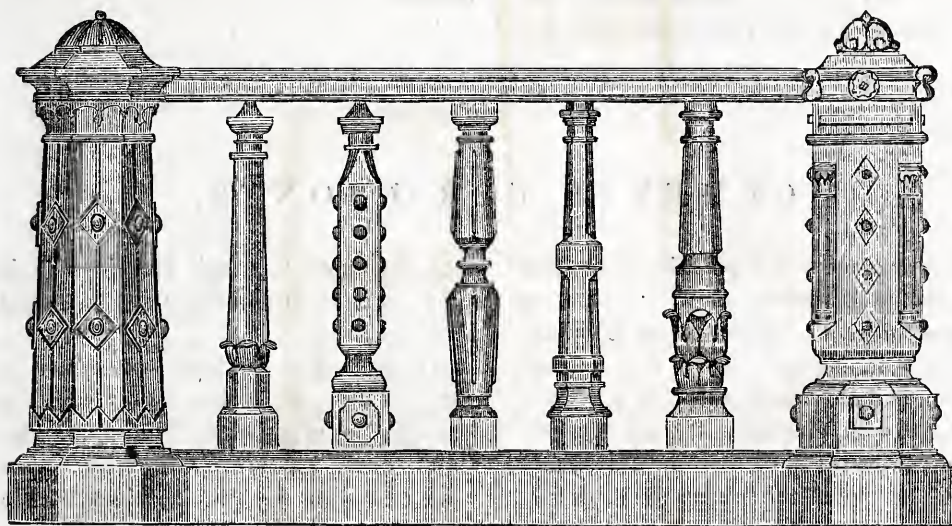
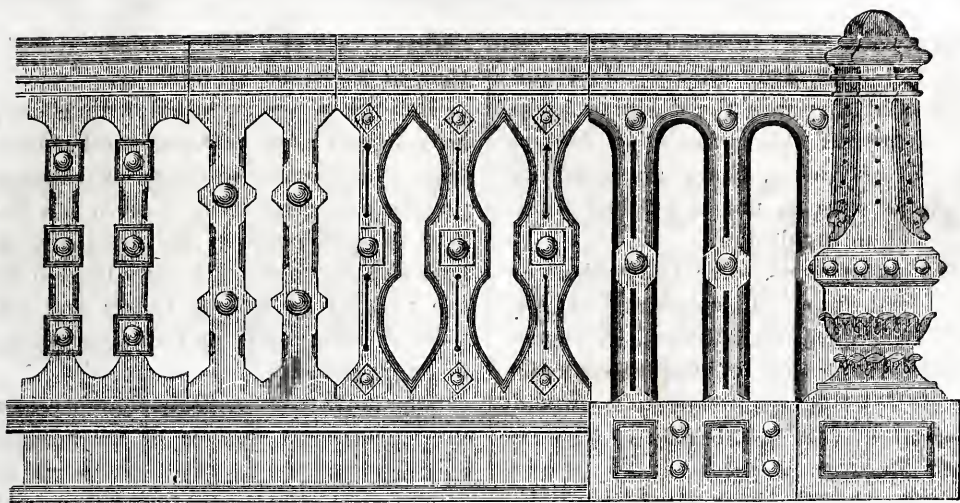
STAIR BALUSTERS AND NEWELS.

IN the modern finish of dwellings of the first class the execution of stair balusters with their newels, has become a very marked feature, and much artistic as well as mechanic skill is exercised upon them. Walnut is the wood most generally used, and in houses where a very superior finish is called for, rosewood and butternut are combined with walnut to form the newel, which is generally an octagon of nine or even

twelve inches in diameter—the cap of which is often very richly carved.

The balusters, as a rule, partake of the same mode of design as the newel, being really a reduction in scale of that terminus.

The balusters of the Capitol at Washington, as well as those of our State Houses, and especially the balusters of the Capitol of Ohio, at Columbus, are richly wrought in colored marble very highly polished. Such are required to be in strict conformity with the general design of the building of which they



form a part. But in domestic architecture the despotism of rule does not exist, and therefore the designer takes liberties with this prominent feature always, of course, being governed by good taste, so as not to produce a discordance in the design.

We here present some suggestions or hints for designs of balusters and newels, which may be found useful. A candelabrum rising out of the cap of the newel, if designed in conformity, would produce a very good effect. This is often done.

In the designs here given it will be understood that the parts shown *black* on the sides of the octagonal balusters

and newel, as also the ornamental buttons or studs, are all of *ebony*.

Mahogany newels inlaid with ebony, have a good effect. Ornamental mouldings of butternut and ebony alternately, present a nice contrast; and in fact the field of adventure in the designing of balusters and newels is only limited by the number of known woods and the natural taste, aided by judicious study, of the architect.

The stair-case or stair-chamber is a very prominent feature of an interior and demands all the effect which can be produced by beautiful balusters and newels.

CEMENTS FOR FRONTS.

IN this country the practice of coating fronts of buildings with *compo* or *cements* does not seem to be popular; whether it is that every city of our Union is amply supplied with the solid material and consequently not anxious to patronize them, or whether the climate has its due influence, we are left in doubt, but certain it is that cemented fronts are very scarce in our cities. In London they prevail, and are looked upon in fact as a necessary protection to brick against the effects of damp arising from the humidity of the English climate. And again, economy has its share in the matter, for cement fronts are comparatively cheap as a very desirable substitute for stone; and being so easily moulded into any required ornamentation, at little cost and with much expedition, give a ready opportunity to architects to display their ideas in the shape of design. Hitherto the *compos* or *cements* offered to the public have tended to condemn them, in as much as practical test has generally proved their worthlessness. They hold only until they dry and shrink, and from that out

they continue to crack and lose their hold on the brickwork until in flakes they fall away.

Another fault in them, or rather in the working and laying on of them, is the absence of uniformity of manipulation. Some parts are stiff, some loose, consequently a separation must be the result.

There is no question but a thoroughly good, well executed cement front is very desirable in this country as well as elsewhere, and we are pleased to have it in our power to say that a beautiful preparation of this sort is now about to be offered to the public. Specimens of it as attached to brickwork and to wood are now before us, and certainly are not alone admirable in appearance but in extreme hardness and remarkable tenacity far surpass anything we have yet seen. The surface is susceptible of a high polish, and stone or marble of any color can be completely imitated. The ingredients are such as will secure success, and the cement now under consideration must as a facing to brickwork prove lasting as well as beautiful.

STAIR MEASUREMENTS.

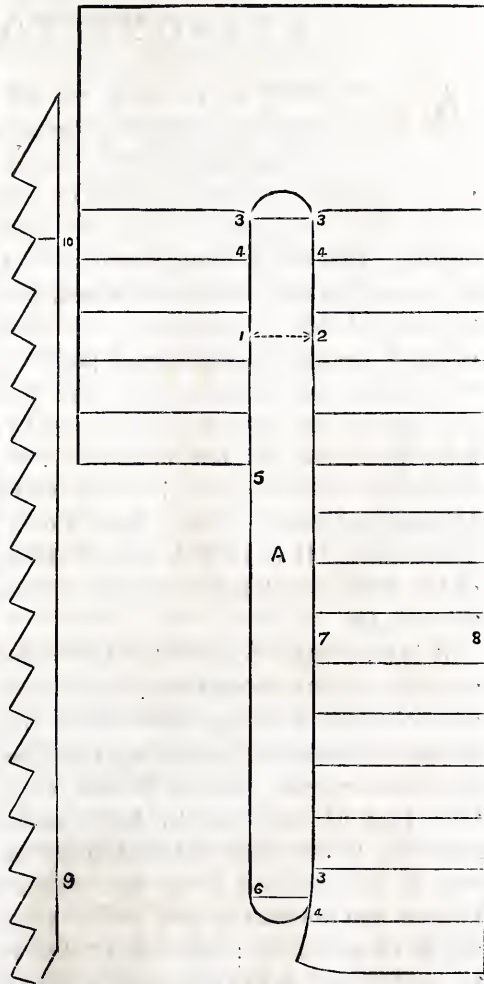
THE Stairs being an indispensable part of house building, not only for convenience and comfort in passing from one story to another, but at the same time as being capable of so much architectural character as to add very materially to the beauty of a building, may be made one of the most prominent features of the interior arrangement of the house, from the fact that they are being constructed of the same materials as used by cabinet makers in making the best class of furniture.

Persons building houses in or near our large cities have no difficulty in obtaining any of the kinds of materials desired to be used in the finishing of their stairs, and at the same time having the advantage of experienced and practical stair-builders by whom the designs of the architect may be fully carried out, and that too, at the lowest possible price for which such work can be done; but those living and building in country places distant from cities, and erecting first-class houses, meet with a great difficulty in the construction of stairs, which oftentimes compels them to have just such stairs as the facilities of their place may afford and which, if under other circumstances, they would not have had.

To obviate this difficulty, and to put it in the reach of all to obtain first-class stairs, a few plain directions are here presented, the observation of which will enable any one to obtain all or any of the parts of such stairs as may be desired, worked out and prepared for setting up with as much accuracy as if the stair-builder had taken the measurements himself; and this at the same cost (freight excepted) as though the building were in the city.

Directions: Give the ground plan of the required stairs, as A. Height of

each story, from top to top of floors, number of steps and risers in each run, with the width and the height of the same, as cut in the horse. Width of opening between strings, as 1 and 2, with



size of baluster to be used; or, width of opening between centres of balusters. Distance of face risers from diameter line of circles, as 3 and 4,—Distance from face of landing-riser on bevel floors to circle, as 5 and 6,—The hypotenuse length of as many steps and risers as can be obtained on the face of the string (giving the number) as 9 and 10—And for the length of steps from face of string to wall, as 7 and 8.

If the carpenter is accurate in taking these measurements as shown, it will insure accuracy in the work. And unless the above or some other equally correct plan of measurement, is observed it will lead to difficulty on the part of the

mechanics in the execution of their work, as well as much annoyance to the owner.

ALLEN BARD, *Stair builder,*

No. 1616 N. Thirteenth street.
Philadelphia, May 30, 1869.

LESSONS FOR LEARNERS.

ACCORDING to promise, we will commence our series of instructive lessons for young men, in this number of the REVIEW, in the hope that we can make this department attractive and useful. There is in every community a great amount of latent talent which, like the bedded mineral, requires to be discovered, brought to light, and polished to its capacity. Innumerable are the instances of genius being discovered by mere accident, and few of our fellow-creatures are not gifted in some way. Education does not create talent, it only develops it. It is, in fact, the polishing of the diamond—the elucidation of Nature by Art.

It is true that a capacity to receive instruction exists without talent, and that education will produce effects which will go far to make up for the want of the heaven-born gift. And it is also very true that he who has to labor most zealously to overcome the incapacity to quickly comprehend, is he who retains longest and makes the best use of that which he acquires. This we all know to be the fact—that the most brilliant men are not by any means the most learned. Thorough understanding and talent are not, nor should they be, strangers.

"With the flash of the gem its solidity too,"

is the motto of EDUCATION, and he who possesses both is perfect in his way. Still, he who has but the one, is better off with the solid, sound, reliable acquirement of study, than he who catches by inspiration and retains but superficially.

PREFATORY DESCRIPTIONS.

Before commencing the lessons, we will give some descriptions of the instruments and other necessities with which the student should be well acquainted, so that as by degrees he becomes possessed of them, he will not be at a loss to understand their use.

THE DRAWING TABLE.

There are numerous contrivances of this very desirable piece of office furniture, most of which fail to meet all the wants of a draughtsman. The drawing-table requires to be so contrived as to be easily raised to any convenient height, and to be sloped to any necessary inclination, and all this without being cumbersome.

Some architects choose to have the under part enclosed and fitted with drawers for the keeping of paper, drawings and tracing cloth. This is objectionable inasmuch as it causes the frequent interruption of the draughtsman, in order to apply to these drawers.

But we will not now stop to review the numerous pieces of furniture of this description, contenting ourselves with simply describing one that we consider most suitable as being easily adjusted, light, strong, and convenient; at the same time that it is perfectly steady, the leaf of the table answering for a large drawing-board.

The engraved perspective very clearly shows the mode of construction of one of those tables, and any carpenter can

put such a one together without difficulty.

The supporters at the back are hinged to the under part of the leaf, and having pins at the lower extremity which enter the holes in the diagonal brace, it is evident that the inclination of the leaf can be adjusted at once to any angle, as it is likewise hinged to the top of the frame.

The shelf underneath will be found very convenient for holding instrument boxes, color tiles, water cup, and any other things not in immediate use. It will also serve as a paper shelf.

The leaf ought to be cleated, as shown, and should not be less than one inch thick. The ends should be neatly planed, and the whole made a true square; for, as we before remarked, it may serve as a drawing-board.

THE INSTRUMENTS.

In the engraving, Fig. 1, is the case of instruments, containing the drawing pen, dividers, [plain and jointed,] the latter having the pen, pencil, and lengthening bar. There is also a spring bow-pen very useful for turning small circles. In the cover may be seen the half circle protractor, usually made of brass or german silver; but those of horn are preferable to either, as not soiling the paper and being so quickly applied to the required angle. The cost is the same whether in brass or horn. The German silver is three times the price of either.

The protractor is very useful for indicating angles, and cannot well be dispensed with.

Fig. 2 is a triangle, a very handy assistant to the drawing-square. They are made to angles of 30, 60, and 90 degrees. The hole is to hang the instrument when not in use.

Fig. 3 is an open or framed triangle.

Fig. 4 is an ivory scale with all its graduations. The edge is divided into degrees, so as to act as a protractor.

Fig. 5 is the reverse side, with various

graduations by which to take off any scale of parts.

Fig. 6 is the drawing-board, cleated on the back and screwed. This board should be made of well seasoned stuff, clean on the edges all around, and perfectly square. In fact it is necessary that the edges be shot from time to time to guard against the bad effects of shrinkage.

It should be full an inch thick, and perfectly free from knots, shakes, or other defects. Pine knots always have a bad effect on drawing paper when wet down and strained over them.

The surface should be very even and smooth.

Fig. 7 shows the edge of the drawing-board, with the cleats beveled off on the angles.

Fig. 8 is the drawing square and bevel combined.

Fig. 9 is the T square, so-called from its resemblance to the letter of that name.

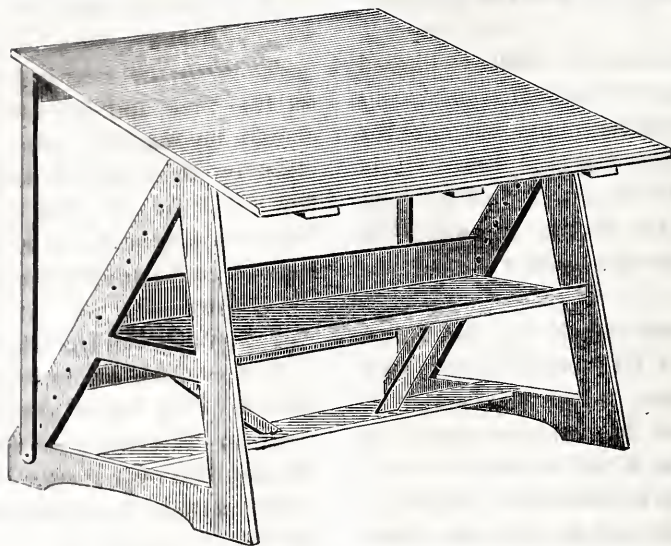
If this be used it would be well to make the other (Fig. 8) a double bevel, so that reverse angles could be lined off with facility; an operation which cannot be performed if one side is stationary. The drawing square should be true to the well squared edges of the board, and the blade should be beveled off on opposite edges, taking care that it be the left on each side of the blade, as shown by the black line in the engraving.

Fig. 10 is the parallel ruler, which whilst in order is a useful instrument, but is very apt to warp and get loose at the turning points; when it becomes unreliable and useless.

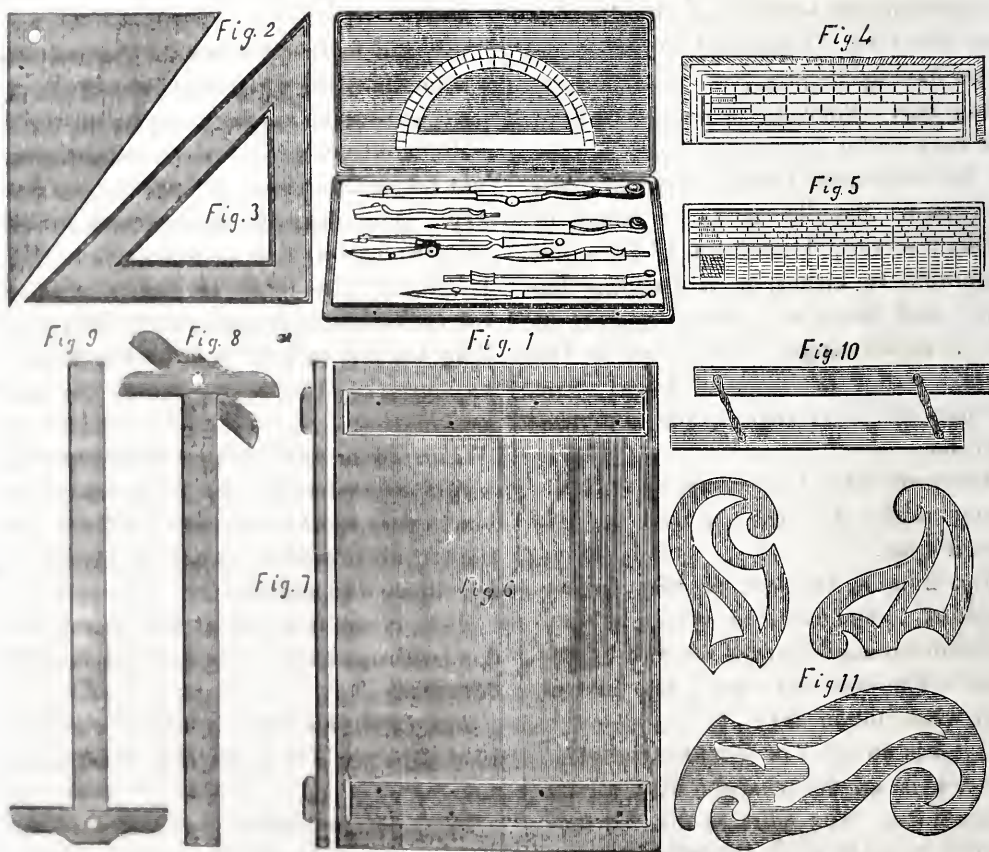
This is an instrument which may be done without, as we will show on a future occasion.

Fig. 11 shows three irregular curves, a most useful help to the draughtsman.

This comprehends the instruments actually necessary to the varied operations of architectural drawing. There



THE DRAWING TABLE.



THE INSTRUMENTS.

are many others which might be added and prove useful, but we now limit our list, so as to bring it within the reach of the majority of learners.

The next thing to be possessed of is a suitable pencil, without which, the instruments, however correct, will be of little avail in the making of good drawings; for the quality of the lines is the main excellence by which alone correctness can be relied upon.

The most popular maker of pencils is A. W. FABER, and the best grade for the learner's use is No. 4. But, when fine lining is to be done by an advanced student, No. 5 is desirable. Indeed it would be well to have both these pencils.

There are several other makers now, equally good with Faber; but there are also many very bad, so that it is advisable to ask for his, as being perfectly reliable, and to buy it at a respectable store (an instrument maker's would be preferable) for there are many worthless imitators of "A. W. Faber." A little attention to this matter will save a vast deal of expense and annoyance to the beginner.

In cutting the pencil for use we would advise as the best mode, to pare one side *flat* to the lead for an inch and a half, or two inches up. The object of this style of cut is to ensure the pencil's point always occupying the same nearness to the edge of the drawing-square. In making the paring round, the slightest inequality will produce an unequal line every time the pencil is turned in the hand. A little observation will prove this to be the case, and the *flat cut* will soon make its correctness visible. In using the pencil it is necessary to hold it as nearly perpendicular as possible, and to lean the hand on the side of the little finger, which will glide along the surface of the drawing-square in answer to the motion of the arm, which should be perfectly free.

A four-sided stick, shaped like a razor strop, having sand paper attached to

each of its sides will be found very useful in keeping a fine point on the pencil. Some use a file for this purpose, and some use a piece of ground glass, or rough slate. This is all a matter of choice. Whatever is used it should be placed, with the instruments, at the right hand side of the drawing-table, so as to avoid the possibility of its being rubbed by the sleeve, and thus soiling the paper.

For *inking in* the drawing, an ink slab or set of saucers will be requisite. The slab is handy as the slip is suitable for grinding on, whilst the three holes or cups receive the ground India ink in three degrees of strength.

A camel hair pencil may be used to fill the drawing pen with ink by pressing it in on the side. It would be well to have a cleaning rag attached to the drawing table to keep the pen clean, so that after filling no surplus ink shall get upon the edge of the square. Besides, the pens should be carefully unscrewed and cleaned after use, and if a small square of chamois leather were provided its use would preserve the pens in good serviceable order and save much trouble. In fact the whole of the instruments should be occasionally polished and all screws kept free from rust.

The *ink saucers* are a collection of six shallow porcelain receivers which shut down one upon another, having a cover for the top one. They are useful for keeping ink or colors from drying up, which speedily happens when they are exposed to the air, on account of the presence of gum arabic. For this purpose then the saucers are very useful.

In some architects, and engineers offices, where India ink is in constant request, it is customary to grind it down in large quantities and put it in bottles with close stoppers. It is thus always on hand and ready for instant use.

If India ink be ground in stale beer the lines made with it are very brilliant, but it does not run so readily from the pen as when ground in water.

The paper to be used is the best German Roll Drawing Paper, extra white, forty inches wide, and weighing eight ounces to the yard. The price is forty cents per yard, and one yard of it is cheaper and better than five sheets of Whatman's Demy at nine cents per sheet. There is no waste, and there is an even surface, which is not the case with Whatman's, which has a crease in the middle.

We now speak of the inferior article of paper suitable for learners, and advise the purchase of the German Roll.

When the size of the intended drawing is determined on, cut that much paper from your roll and turn in the four edges, say three-quarters of an inch. Then straighten them out again. The inside of the roll is the right side, which must be gone over with a wet sponge until it is well wetted, leaving no water standing on the surface. The paper is now to be placed evenly on the board fair with the sides, and the edges before turned are now to be evenly coated with

a strong solution of gum arabic, glue, glycerine or paste. The first we think is best. The gummed edges are now to be pressed out, and all air carefully excluded. Four flat sticks placed all around and heavily weighted will accomplish this purpose if left on sufficient long to dry perfectly. The body of the paper, wet with water will strain as it dries, and if it does not pull too hard upon the edges will leave a nice smooth surface to work upon.

However, success in this matter depends altogether on the watchfulness of the operator.

With these preliminary remarks we will proceed in our next number to guide the learner forward and make his work as easy as a fair knowledge of its first difficulties will assist in doing.

During the progress of these lessons we will always be ready, and ever desirous to answer any questions, or elucidate any difficulty which may occur; as our object is to render them as practically useful as possible.

THE IMPORTANCE OF BUILDING.

WE wish we could impress the general mind with the vast importance that attaches to Building as an art and as a trade. Few, comparatively very few, ever suffer the subject to have a place in their every day thoughts—and that few are intimately connected with its existence. Not but that the number of those actually relying on Building for a living is very great—No, every trading community is chiefly composed of those who depend entirely on the great art for their living, and could not sustain themselves a day without its demands on them. Is it necessary to prove this assertion by referring to the numerous trades and callings that go to make up the Building community? And yet, with this fact staring the

world in the face how great is the apathy of that world towards the merits and the interest of this industrial commonwealth, constituted by Building and its dependents.

The Hardware man looks upon his as a trade in itself, and considers that Building is rather dependent on him, than he on it. But were it not for the manifold requirements of Building what would become of his stock. Where would be the demand for his locks, hinges, bolts, screws, nails—and the thousand and one etceteras, not to speak of the tools required by artizans.

The Lumberman despises mere Building as an ignoble trade. He is above it; and the builder has to come to him for a supply which cannot be done without.

But suppose Building were to cease—What then? How long would the Lumberman keep up his head?

We will not waste time with enumerating trades dependent on the one great one. Every man who thinks, knows it well enough that Building is the great head-centre of all our wants, and that every community, great or small, is dependent on it. Is it not then well deserving of all the attention that should be given to it—is it not a science founded on sciences—and does it not call forth an amount of practical sense far surpassing sciences much more fashionable?

Architecture is but the decoration of this mighty art, and yet what an art is Architecture itself, combining, as it does, at once the practical with the beautiful and the sublime. Still the great majority of men of gentle breeding will prefer the enjoyment of a painted landscape on a scrap of canvas to the ennobling greatness of a perfect architectural composition. They may even look at its semblance in an engraving, but it will not be with that pleasure that they feel in examining some pretty bit of landscape or figure. The truth is that it calls for too much action of the brain, even a moderate demand on which they are either too indolent to meet, or have not a sufficiency of to enable them so to do.

Do we ever pause to reflect on the absurdity of men of learning poring over every little item of information regarding the ruins of thousands of years ago in lands thousands of miles away, who would not lend an hour to the examination of the fresh buildings of their own day standing around them. True, they might raise their eyes to them, but scarcely their thoughts. Do our public lecturers ever treat of Architecture or Building? Oh, certainly not—for if they should be able to do so, who could they expect to have for an audience but *mere mechanics*. The subject is so *dry*, too—unlike Geology, or Political Economy;

and so few understand its merits or its meaning. The well-dressed crowd would rather pretend attention to a heavy discourse on chemical affinity, than even to yawn over the historic interest that attaches to Architecture.

Is it not the duty, if not the policy, of our professional brethren to try and make the subject popular by lecture and exhibition? Without educating the public taste it is out of the question to expect that the apathy towards it can ever be dispelled.

WHEN TO CUT TIMBER.—A Missouri correspondent of the *Rural World* takes exception to the various opinions, scientific and otherwise, that are now floating around among the agricultural papers. As we deem practical information on this subject to be very desirable indeed, we give the opinion in question, which is as follows:—

“I hope you will allow me to say a few words concerning our experience in cutting timber for durability. When we cut timber at any time of the year except July, August or September, the process of seasoning is so very slow that the timber becomes infested with innumerable quantities of worms, that cut and bore it to such an extent as to damage it badly; and, even when the trees are sawed into planks, a few months after being cut, we find the logs bored to the centre—not only injuring the sale of the plank, but rendering it useless for many purposes. And, again, the smaller limbs will, in a few months, fall to the ground from natural decay. But, we find by cutting timber in July, August or September, that the bodies of the trees season hard and are not troubled by the worms, whilst the smallest twigs season hard, and remain sound at least three or four times as long as those of timber cut in the winter or spring.

R. E. L.

St. Francois Co., Mo.

ANCIENT AND MODERN BRICK.

WE have in our possession some specimens of brick, stone and mortar taken from the remains of the great Roman wall in England, built by order of Constantine the Great, A. D. 304. The thickness of this wonderful work was from ten to twenty feet and the specimen now before us was taken out of the corner of Aldermanbury Postern and London wall, the breadth at that point being ten feet.

Those Roman bricks were shaped like our flooring tiles, being an inch and a quarter thick, and they are exceedingly hard. We have tried their capacity of absorption and find that when saturated with water, they obtain in weight fourteen *per centum*, whilst our building-brick absorbs in the same time, twenty-five *per centum* of weight in water.

When we consider the time this Roman brick has been under pressure in the wall, now *fifteen hundred and sixty-five years!* and that the burning of it (owing to its comparative thinness) was very thorough and uniform, there is more reason to be surprised at the difference between the ancient and the modern brick being still greater. In fact, our pressed-brick will stand in a still more favorable light when compared with the Roman article; and when the same number of ages have indurated it, the speculation as to quality may *then* be vastly in favor of the brick of the present day. But we will not look so far ahead for fame, preferring to boast of an article that suits our construction and our times.

The Dutch brick of former days will hold its own with the best of the Roman to-day. It is, in fact, less porous and of a richer color. But these characteristics have reference to the clay of which the two were made. The brick now to be seen in the Colosseum at Rome is certainly a fairer specimen of the bricks of that nation than are those made of

English clay, although the work of Roman brick-makers.

There is one point in the manufacture of ancient bricks to which the particular attention of our makers may most profitably be called, and that is the total exclusion of all clay which has an undue proportion of lime in its natural composition. All clay has a proportion, some more, some less, but that which has an excess, when worked into brick and built into a wall, will give out its efflorescence in a short time and produce that effect so very disagreeable in appearance and so difficult to be overcome.

All lands intended for brick-fields, should have their earth carefully tested by a good practical chemist, and the tests made as comprehensive as possible.

Too much care cannot be taken in the operation of tempering, and where a superior class of brick is desired, two or three years ought to be allowed for the atmosphere to act thoroughly on the broken and npturned clay intended for use. No stony particles should be allowed to remain when the tempering operation is commenced, and no labor should be spared in turning and working out the whole, adding, from time to time, as little water as possible, incorporating the sand or ashes with the earth as thoroughly as it can be done.

The presence of sand is useful in producing a flux, and as most clay possesses a sufficiency of silica as well as of alumina, the introduction of sand is to be proportioned accordingly.

In some parts of the United States, a very poor quality of brick is made, not so much on account of the lack of the ingredients of the necessary quality, but because of the total ignorance of the very nature of the ingredients used.

The Government Construction Department has a very good rule which it would be well for architects generally to form

and insist upon. It is, that the bricks shall be saturated with water before being used. The consequence is, that any bricks which are *limy* will testify their unworthiness by fracture, owing to the swelling of the lime in their composition, and as that latent lime will assuredly slake sometime, it is better that it should do so before the brick is placed where such an action can create mischief in a building.

In ancient times, as now, the brick was ever a favorite material for building

with; and, as those distant ages produced an article that has endured until our time, why can we not emulate their scientific care in the manufacture of this most useful friend of progressive civilization, and thus pass our name to remote posterity? We have the requisite material, and we certainly possess the acquired knowledge that experience has given us. Then why have we not the ability to carry this trade to perfection, as we have done so many others not to be compared to it in utility?

A NATIONAL ART INSTITUTION.

THE free picture gallery presented by Mr. W. W. CORCORAN, the banker at Washington, to that city, ought surely be made a NATIONAL institution in the fullest sense of that term. Hitherto it has been in possession of the Government, and during the past years of trouble has been used as a United States Quarter Master's Department. The rent due for this occupancy has been ordered by Congress to be paid, and this sum will go to form a fund in support of the original gift of Mr. CORCORAN, which that spirited friend of American art proposes to still further augment by another munificent gift of three hundred thousand dollars. This fund will be dedicated to the purchase of valuable paintings and works of art as well as to the future enlargement of the gallery.

This is really cheering news to the lovers of the fine arts throughout the United States, and will infuse fresh vigor into the hopeful efforts of our artists generally.

Hitherto our only national *display* of pictorial genius was confined to the Rotunda of the Capitol at Washington, and embraced a collection of commemorative paintings of the Revolutionary war, dear to the nation as containing many likenesses of men whose memories are em-

balmed in our history, but not at all creditable to the taste or art-skill which as a people we would wish were presented to the foreign visitor, who cares comparatively little for the simple portraits which we Americans hold so very dear.

In our preceding volume we endeavored to urge on the architects of the United States the formation of a National Gallery of Design at Washington. Can not this princely gift of Mr. CORCORAN be made available for such a purpose? The Trustees, we entertain not a doubt, will sustain the proposition and give every required facility for the carrying of it into effect.

If every architect in the United States would prepare and present one original design of any description or style he might fancy, what a nucleus would it prove for a progressive collection which would ultimately do honor to the greatest of the three fair sisters, the Arts.

This is certainly a subject well worthy of consideration by the profession all over the country, and one that can be easily put in practice. But in the carrying of it out we would venture to suggest that the rule of *originality* be imperative; for, it would be a *passé* exhibition indeed that would be made up of defeated competition designs and of old drawings which erst have hung in idle

elegance on the office walls of the architect for any time. What should form a collection worthy of being considered NATIONAL would be a fresh display of fresh thoughts wrought out in a style worthy of attention, and likely to impress the observant with respect if not admiration for American architectonic genius.

To ensure anything approaching perfection in an exhibition such as that we propose, it would, of course, be necessary to have a committee of scrutiny, composed of eminent architects, to judge of the merits of such works, and carefully select the worthy and decline the bad.

No limit as to time should be made, but every architect at his leisure mature his conceptions and send forth that of which he may have just cause to be

proud. We know that there are many of the profession who would shrink from making themselves thus public. But do they not seek notoriety in their builded works, and why not in the simple form of design? This would be a purely national collection, bringing together every section of our vast country and representing the genius of every architect in it. From decade to decade the changes of style would be marked and the improvement or retrogression noted. Thus would such a permanent exhibition become an educator of the public taste, by familiarizing the eye with the proprieties of design and the amenities of ARCHITECTURE, and held in the same national gallery with PAINTING and SCULPTURE, it would be in its proper place.

IMPROVED AWNINGS WANTED.

IN the midst of the great advance of mechanic art, and the cultivation of all those means of comfort which go to make what we may well consider refined civilization, there is often a strange and unaccountable neglect of certain very palpable matters, the inconvenience of which, strangely enough, is constantly recurring to us, and yet brings no reform.

Every city in our Union is, and has been subject for many years to the positive nuisance of what are called "awnings;" a stupid device to protect goods in store windows from the action of the sun—and this at the expense of the public comfort. To effect which purpose the plan, almost without an exception, is to use sail-cloth, either stretched or on roller. In very heavy rain the awnings that through a negligence, far too common, are left spread out over the sidewalks get filled with rain-water, and ever and anon, deluge the passengers who are necessitated to walk under them. They all are claimed

to be *water-proof*; and such is the actual fact, for they do discharge the water as in the manner stated; and in proof of which so many witnesses can seriously testify. The wind frequently assists in this ejection of water; and does more, for it makes such serious rents in these sail-cloth ceilings that the rain, like the express trains, "goes right through, without stoppage!"

And, even where the things are fairly rolled up (more through economy on the part of the proprietor than for any regard for the comfort of the dear people), the framing yet remains to catch the falling rain and transmit it in heavy drips to the recipient dresses and silk hats whose wearers have the luck to be on hand.

A cry of "stand from under!" would be altogether vain, for there is a forest of such bare poles or bars still awaiting the unfortunate in his fancied escape. It is literally running the *rain-let*.

Now, in sober sadness let us ask—why is this shameful nuisance per-

mitted? Have we no better means of shedding the sidewalks from the sun than by this antiquated make-shift?

Our areas have been made pleasant with the light of day transmitted through ground-glass. There surely is no reason why ground-glass, of a much less thickness, could not be used in sliding-frames for the purpose now so barbarously monopolized by sail-cloth. Whether it rained or not, the glass would prove a protector to the foot passenger. And moreover, the merchant might have his sign on the glass, and with the aid of artistic taste this side-

walk covering might be made a most desirable decoration as well as a necessity to our street architecture.

We merely make the suggestion in the hope that some ingenious inventor may turn his mind to a subject that all have more or less a feeling appreciation of.

Let some fitting substitute be given to the public, and municipal authorities peremptorily abolish the existing trespassings on our streets in the form of those *awnings*; a sound so closely akin to the other expression—*awful*, as to be truly suggestive.

THE GREECE OF TO-DAY.

THE following passage is quoted from the *London Times*, descriptive of the recent visit of the Prince and Princess of Wales, to Greece:

"Athens has certainly improved very much since the period of the occupation during the war with Russia. What the increase in population may be I cannot say, but in streets and in houses Athens is enlarged and beautified. Nevertheless, it is a city which is like a mistletoe on a ruined oak, it clings to and grows from decay. Take away the Acropolis and the Temples of Jupiter and Theseus, and what have you but glorious sites and memories that haunt them? Cities, however, do not on sites or memories either. I cannot but think it was a mistake to build up the new city round the grand old monuments of a civilization which is not dead, but lives every day of our lives. The present new buildings hinder the reconstruction of the old, and forbid or impede explorations. Still there they are, with 'gas and water laid on,' shops of modistes, where the Aspasia of the hour may find the newest Paris fashions to charm her kid gloved Pericles, and all needful magazines for necessity or luxury, in long array, cross-

ing the outlet of the old Holy Road to Eleusis and Dapne's Wood, and creeping upwards towards the foot of the storied crag where rest in immortal beauty the remains which enchant the world.

"The palace of the king stands in a fine position on a slope of Mount Lycabettus, and rears a broad front of marble, quarried from Pentelicus, toward the city, from which it is separated by a broad stretch of shrubbery and lawn open to the public, prettily laid out and planted. Spacious roads and walks like boulevards lead to a semi-circular pile of houses, several of them hotels, from which radiate some of the principal streets. The eastern side of the palace abuts on a charming and extensive garden, also open to the people, and much frequented in the afternoon. All the walls of the palace and the internal courts are of fine marble, and two magnificent state rooms are supported on rich columns of the same material. The views from the windows are extremely beautiful and interesting. On one side you may see the Piræus and Bay of Salamis, and the road from the capital running by the course of the long walls

and through the field and Olive forests of the Attic plain.

"On another side the groves of Academus and Mount Anchesmus; the Acropolis arises before you on another, and Ilissus trickling down below. At another side your eye rests on the blue waters of Phalerean Bay. In the city beneath, modern Athenians are busy as bees. The rooms of the palace are large, lofty, elegant, rich and comfortable. The king is gracious, frank, and a touch of his

cordial sailor life oftentimes rises to the surface. There is an excellent library where the learned Dane, Dr. Koppen, familiar with many lands and many languages, works in old world volumes. There is a very good band, taken from the musicians of different battalions, which plays in the morning and during dinner. There is no theatre open now, but there is quite enough at Athens to enable a visitor to pass his time and find it short."

VENICE AS SHE IS.

A CORRESPONDENT of that excellent American journal of Paris, the *Continental Gazette*, describes the lovely "Queen of the Adriatic" in the following highly interesting manner:

"It is not very great praise to say that Venice presents a cloudless sky in the merry month of May. We have seen cloudless skies in England at the same season, and all nature as fresh and green. As we came from Bologna the distant mountains were white with snow, and the breezes were cool which came to us over the waters. Venice sits upon the sea. We had read always about the canals of Holland, and were yet surprised to find them so numerous. At Venice we are surprised to find anything but canals. We did not expect to take a walk in a city founded upon water. But there are more than 2,000 streets and only 150 canals. Every point can be reached by land, and two and a half miles is not a very long walk for good pedestrians. The streets are narrow, but they are clean and well paved, and little gardens—like oasis—appear here and there in the wilderness of houses. The canals are narrow also, except the great central one, and the gondolas seem to us few, considering that they are the only carriages in a city of 100,000 inhabitants. How noiselessly they glide

about. One can scarcely believe that commerce and trade and manufacture exist where not a sound is heard but the paddled canoe, and nothing is seen of the hurry and bustle and interchange of ordinary life elsewhere. At Port Chioggia there are great ships, and at the mouth of the great canal is the Custom-house, where all foreign merchandise must be registered; but bales and barrels and boxes cannot stand about on the water, crowds cannot gather to witness what is going on, and those who buy and sell and bargain must be on *terra firma*; thus, as we pass upon the watery ways, there seems to be nothing going on. The world is asleep, day as well as night. Yet they must eat and drink and have wherewithal to be clothed. We meet only now and then one asking alms, and poverty, if it exists, is not so visible as in any other city we have seen.

"During a few days a fair was held in the gardens of the Palais Royal for the benefit of the Sailors' Hospital, and we could see there the beauty of Venice gathered together, and the pretty gondolas in which they arrived filled the canal under the walls of the Palace. They are black without, but within are white or red or blue or variegated, with soft carpets and silken cushions like the carriages of the rich in other cities. We

saw the dainty feet as they sprang upon the marble pavement, and the elegant toilets of the Venetian *noblesse*, for the owners of palaces made themselves shop-keepers to gain money for charity, and gallant men paid any incredible price their pretty lips might name for little nothings to win a smile. Alas! a great misfortune happened in consequence of the smiles of one who lavished them a little too generously. Two, besides her husband, believed they had the sole right to bask in her charms, and this being contested by each, a quarrel arose that could only be settled by the sword. They resorted to the cemetery to brandish their weapons, and serious wounds were inflicted, but not death. The combatants were an Italian and an American. The Italian is maimed for life, and the lady smiles as gaily as before. The results of the sale were 40,000 fr., after all expenses were paid, which the ladies obtained more easily than the tax-gatherers would have done. Similar efforts are to be made for various other objects which have nearly sunk into oblivion during the humiliating bondage Venice so long endured. Those who saw her only a few years ago say she is scarcely to be recognized, she has so recovered and adorned herself, but she has not put off all her sackcloth, and will be long in recovering the freshness and beauty of her prosperous days.

"The city boasts never to have been taken by siege or assault, but many of the palaces look as if they had been battered for ages, and the treasures they had accumulated have been crumbled to dust or scattered to the winds.

"The hammer and the saw are at work in some of the courts repairing the damage foreign soldiers caused, when marble halls were converted into barracks, and the mirrors of boudoirs reflected the forms of burly officials, who only studied how they could most deeply insult a conquered people. It is difficult to believe in the glorious age of the Republic, feared and envied by half the then known

world. In the Ducal Palace are the portraits of the 115 Doges who presided during seventeen centuries in the councils of the nation, and if they had allowed the people always a voice in the deliberations, their enthusiasm would not have failed in the hour of need. Now they are united to the Italian brotherhood, and are content. This city is still beautiful though a little faded, and time will restore to her all her charms.

"The three hundred bridges are mostly of marble and pretty in form and effect; formerly there were three hundred churches, but now only one hundred, the majority having been converted to other uses, and the treasures of the many have been gathered into a few.

"The master-works of each great master can only be seen in his native city, and we cannot comprehend Titian, Tintoretto, Paul Veronese, and Canova elsewhere than in Venice. Their works form a history of the rise and fall of the Republic; more proud of them are the Venetians than of any of their hundred Doges, though some of these were brave, and one refused a crown after having conquered an empire, and his name is written highest among those whom they honor. The republican spirit was never quite extinct, neither when aristocrats ignored it, nor when crushed by foreign oppression. During all the years of their servitude the great theatre, San Felice, was closed, and neither money nor threats could induce them to open its doors. On no occasion would they give a sign of pleasure or indulge in any amusement. The Empress of Austria once paraded in grand cavalcade the whole length of the grand canal, hoping to hear the *vivas* so sweet to royalty, but not one saluted her ears. Even the pigeons flew down from the eaves of St. Mark with the Italian colors painted upon their wings.

"What a curious old church is St. Mark,—like nothing else we have seen in the way of architecture; entirely of bronze, gold mosaic, and marble, all

without and within in Oriental style. It is very sombre, and the first impression is disagreeable, but after having been studied in detail it becomes magnificent. We have seen many, but this excels them all in the richness of the material employed and the genius displayed by the architects and artists. One must be told that the 500 columns are of porphyry, hard antique serpentine, veined, and other costly marbles, but it is plain to see that the vaults of the many domes are rich mosaics on ground-work of gold.

"All the commerce of the East passed by the Adriatic when Venice was in her glory, and she could easily supply herself with the gorgeous productions of Southern climes, and no other city was so rich in the talent that knew how to appropriate them. St. Mark is full, and nearly every church contains one or many marvels of art in painting or sculpture, and though the palaces were in a measure despoiled they are still wonderful to behold. The one in whose depths we are buried was allotted to foreign Ambassadors in the time of the Republic, and since is known as the Palazzo degli Ambasciatori. The architecture of the front ranks among the most beautiful, but within nothing remains but suites of great empty rooms, as is the case with so many others. Opposite is the house where lived the beautiful 'Guiccioli' of Byron, and at a little distance another, where the syren Benzoni attracted all the world, and whom poets, artists, and gondoliers are still in the habit of praising. We have passed under but not over the Bridge of Sighs, which connects the palace and the prison, and stood by the tombs of Titian and Canova in the church of St. Marie des Frari, and listened to the song 'My gondola's waiting below love,' by moonlight, and the music of the dipping oars. This is all we have been able to see in a few days. In a month we shall have seen all, and may, possibly become enchanted with the queen of love and song and beauty."

STEAM vs. MORTAR.

IN the New York *Scientific American* of May 15th, is a communication from Fairfield, Iowa, reporting the fall of the chimney of a flouring mill in that place, which caused the entire destruction of the mill in question. The origin of the catastrophe was the turning of the escape steam into the brick flue. Now, it is strange that such errors can be committed by thinking men as to let such a subtle agent as steam in upon such an absorbent material as brick. With the exception of oil, there is no more searching power than that possessed by steam. And when we consider how liberally brick admits water into its pores we cannot be surprised to see what the effect of the injection of steam must be on it. It is not impossible that common lime mortar was used in the brickwork, and that there was a total absence of pargeting. We should under these circumstances, be very much surprised indeed if such a chimney, under such a destructive influence, could stand for any length of time.

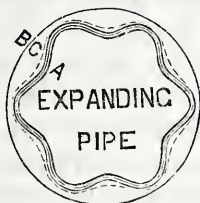
The writer alluded to, says, that the escape pipe was let into the chimney near its base, and that at this point *the bricks could be crushed between the fingers*, while the balance of the chimney was perfectly solid.

CUTTING GLASS BY HOT AIR.—According to *Les Mondes*, the use of hot air or gas, for cutting glass, is a new and useful invention. The hot gas issues from a pointed or flattened tube, and is driven directly upon the goblet or other object to be cut, which is placed in close proximity to the tube, and made to revolve upon its axis. A narrow circle of heated glass is thus formed upon the object in question, which being damped immediately afterwards causes the glass to divide with extreme neatness at the part thus heated. The operation is more rapid and effectual, it is stated, than any means hitherto employed for this purpose.

FROST PROOF TIN PIPE.

THERE is nothing more troublesome to householders than the mischievous action of frost on gutters or water pipes; for, the expansion of the water under the influence of frost and the consequent pressure on the pipe or conductor is such as to overcome all ordinary resistance by the great enlargement of the area of the water.

To guard against this severe action of frost MESSRS. AUSTIN & OBDYKE patented an expanding pipe, of which the accompanying cuts will present a more ready idea than we can in words.



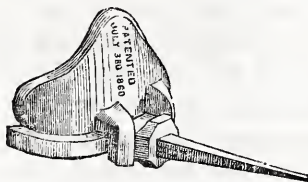
The corrugated form adopted by them is one well calculated to meet the exigencies of the case; for the expansion of the freezing water is yielded to gradually by the spreading of the corrugations A, until (if so great an enlargement be required) the outer or full stretch-out circumference B, is attained. C, marks the gradual increase of the pipe by the pressure of the expanding fluid while freezing.



This cut shows the upright pipe cor-

rugated for expansion, as already explained in the plan.

The three holes denote the points where the fastenings come which are to attach it to the wall.



The patent Pipe Fastener, invented by Austin, is here shown, with the spike which enters the wall. This arrangement keeps the pipe from the wall and effectually prevents dampness.

The claws are attached to a shield on the pipe and the spur closes up into the the claws. Thus keeping all firm. This fastener admits of the removal of the pipe at once without disturbing the spike or spur in the wall, so that there is little trouble, and no destruction of the brickwork.

THE OLDEST HOUSE IN THE UNITED STATES, in Neponst, Mass., was built by John Minob, about the year 1670. It is still in good repair, and the Minob family still hold possession of it. In 1670 it was attacked by three Indians during the absence of the male portion of the family. A female servant and several children were in the house. The girl hastily barricaded the door and seized a loaded gun. The first Indian attempted entrance by an open window, but was met by a shovel of burning coals from the fire place, which was thrown into his face by the girl. Another savage, who appeared at the window, was shot dead, and the survivor made a hasty retreat.—*New York Tribune.*

NEW SOUTH WALES.

WE are put promptly in possession of our regular files of the *Sydney Mail* and the *Herald*, down to the 27th day of March; an extraordinary speedy delivery, considering that they were received by us on the 1st of June. *Two months and four days!*

There was much rejoicing over the second visit of Prince Alfred to Sydney, and the laying of the foundation stone of a monument to that great voyager and discoverer, CAPTAIN COOK, who landed on that very coast, was made more historical by the fact of the son of the Queen of England performing the ceremony.

Speaking of this monumental tribute to a truly great man, the *Sydney Mail* of the 20th of March, says:

"The Cook's Statue Committee have decided at last that the best site is in Hyde Park, opposite the Museum—an elevated position, which is visible from part of the harbor, and of which there will be a good view all round. Mr. HOLT, who owns that part of the shore of Botany Bay where the great navigator first landed, and where the important ceremony of taking possession of the continent in the name of the King of England was performed, is of opinion that the site ought to be marked by some memorial. But as the committee do not adopt this view, he is about to carry out his idea himself, and has arranged to erect an obelisk with a suitable inscription."

And on the 27th of the same month has the following:

"CAPTAIN COOK STATUE COMMITTEE.—A meeting of this Committee took place on the 19th instant, at the Chambers of his Honor Sir Alfred Stephen, who occupied the chair. Mr. R. B. Smith read a copy of a letter written by him to Lieutenant Haig asking his Royal Highness when it would be convenient for him to lay the foundation stone of the Captain

Cook Statue. An answer was returned to the effect that H. R. H. the Duke of Edinburg would have great pleasure in being present on the ground at 3 P. M. to-day, 27th instant, for the purpose of laying the foundation stone. Mr. Eagar, M. L. A., on behalf of the sub-committee for selecting the designs most suitable for trowel and mallet, stated that they had decided in favor of a trowel made of silver, which would cost £12, besides deciding on the design for a mallet. We were on Wednesday shown the trowel to be used by the Duke of Edinburg on Saturday the 27th, for the purpose of laying the foundation stone of the pedestal on which it is intended to place the statue of the great navigator Captain Cook. The design is very neat, the metal of which it is formed is silver weighing between eight and nine ounces. On the outer edge of the blade is engraved a wreath of vines and grapes. The handle—of pure ivory—is joined to the blade of the trowel by handsomely chased and frosted scollop work, mitred at the upper edge. The top of the handle is mounted with drooping leaves, and a miniature waratah. the following inscription is on the blade: 'To H. R. H. Prince Alfred, K. G., Duke of Edinburg, &c., &c, on his laying the foundation stone of the Statue, intended to commemorate the illustrious navigator Captain Cook. Sydney, New South Wales, 27th March, 1869.' The trowel is contained in a stained cedar case, lined with blue velvet and white satin; the mountings of the case being of silver. The trowel is the work of Mr. Hollindale, of 104 King street, where it is now on view."

The laying of the foundation stone was performed on the day of the departure of the mail we have received, and there is no doubt but the occasion was a memorable one; for the whole

civilized world was served by Captain Cook in his fearless ventures; and science everywhere gladly pays tribute to the memory of her son.

A NOVEL SUGGESTION FOR A PROCESSION—A humorous correspondent of the *Nelson Evening Mail, New South Wales*, referring to the expected visit of the Prince, suggests that a procession shall be formed in the following order:—“Bankrupts, Mortgagees, and Mortgagors. This is supposed to comprise the entire population; should there be any left they can bring up the rear.”

It does not appear that the cause of education is upheld as it ought to be in even a comparatively young colony, as we judge by the editorial remarks of the *Sydney Mail* regarding a private concern which is threatened with sale and consequent dissolution.

That paper says:

“PARLIAMENT does not seem inclined to purchase the Australian Library, for the debate was got rid of by a count-out, so that the building, if not the books, will probably soon be brought to sale by auction. It is possible, however, that the building only may be sold, and that the books may be housed in some cheaper premises. The authorities of the library at Melbourne are anxiously awaiting the chance of buying up some of the rare and scarcer works, and yet it would be a pity if they were allowed to leave Sydney.

“Just as the proprietors are wanting to sell their building the front wall is declared to be dangerous. It has been leaning for some years, but has now leaned so far as to be considered unsafe, and the CITY ENGINEER has officially ordered it to be protected. It will cost five hundred pounds to rebuild the damaged part.”

EDUCATE RURAL TASTE.

The following thoughts of the *Horticulturalist* so perfectly suit our ideas on

the same subject that we take the liberty of transferring them to our columns.

“It is a common mode of thought to assert that the farm and the home should be the spot in which a taste for rural ornament can be most appropriately and successfully developed. This is true but as a sequence from other beginnings; and we are disposed to attribute the education of one's taste as much to the associations of the school-room and grounds as to home associations. If in our country districts the old, shaggy, red or brown weather-beaten structures were replaced with buildings of an ornamental style of architecture, with grounds appropriately laid out and planted in something simple, perhaps nothing beyond a pretty lawn plat, surrounded by a neat fence, and planted in evergreens, we feel sure that the constant sight of this pleasant object, and the associations naturally formed in the mind of the scholar, would do far more good than centuries of lectures or libraries of books. The taste of a child comes from the school-room as well as the home, and goes from the one to the other. Hence we make a plea not only for the improvement of our country school-houses, but for the importance of extending this subject even beyond, to college grounds. In the minds of college managers it seems only necessary to secure the ground, “the *terra firma*,” and then build their massive walls; and when that is done, all is done. Not so, indeed. Thousands of young men and women frequent these grounds day after day and year after year. If the grounds are well laid out and tastefully displayed, there is an opportunity presented for the development and culture of a refining taste, such as no musty literature ever possessed. It is practical, too, and will insensibly help to mould the future disposition and character, and act on it for years to come. Let us then remember, that if we would have rural art and taste become widespread, we must begin with the youth of the country, and at the fountain heads of education.”

ACOUSTIC FAILURES.

IT is a fact, and one that will scarcely call out a dissent, that few, if any, of our Architects ever enter on a serious study of that science which would enable them to ensure to their churches, public halls, and other buildings, that most desirable of all conveniences, the facility of perfect transmission of the sound of the voice. That the interiors of structures, such as churches, music and lecture halls, theatres, and in fact all public places, where people go to hear what is said or sung, are more or less favored in this respect, is not owing to the scientific guardianship of the Architect so much as to mere chance; and that mere chance is not as often on hand as could be wished. But, soberly speaking, why is this science of acoustics neglected by the great body of our profession? Some consider it a very abstruse science, and one of which little, comparatively, has been said in books, and that little so vaguely said, that no Architect in good practice can afford the time required to study it out. It is men outside of the architectural profession who have devoted time and mind to this subject. The late Dr. Reid, of Scotland, who visited this country, during the war, for the purpose of giving valuable information to our government on the subject of hospital ventilation, was an earnest searcher after palpable facts, not untried theories, in Acoustics. And he found much in the study of ventilation to afford suggestions in the latter science.

On another occasion we will go fully into this part of the subject, our simple aim at present being to awaken attention to the absolute necessity for not alone an acquaintance with, but a thorough knowledge of Acoustics on the part of the Architect, who undertakes to give us public halls of any description, in which the unwelcome *echo* may

be wholly unknown, and sound may be equally distributed throughout the required space.

Sound is governed by the same laws as *Light*. It has its reflections and refractions, and demands the same proportion of space to harmonize its effects. Without this proportion, the discord of echo must mar the effort at the perfect distribution of sound.

Much has been surmised on this subject by theorists, and much practical knowledge has, no doubt, been obtained by Architects in the unhappy failures which have warned them of their neglect of the principles which ought to govern in this matter.

Doctor OLIVER WENDELL HOLMES, in speaking of the great organ, at Boston, throws, in his own lucid style, more direct light on this subject of Acoustics, as applied to Architecture, than all the erudite writers who have essayed to educate us on it.

"The great organ would be but half known," says Dr. Holmes, "if it were not played in a place fitted for it in dimensions. In the open air the sound would be diluted and lost; in an ordinary hall the atmosphere would be churned into a mere tumult by the vibrations. The Boston Music Hall is of ample size to give play to the waves of sound, yet not so large that its space will not be filled and saturated with the overflowing resonance. It is one hundred and thirty feet in length by seventy-eight in breadth, and sixty-five in height, being of thus somewhat greater dimensions than the celebrated Town Hall of Birmingham. At the time of building it (1852), its great height was ordered partly with reference to the future possibility of its being furnished with a large organ. It will be observed that the three dimensions above given are all multiples of the same number (thir-

teen), the length being ten times, the breadth six times, and the height five times this number. The significance of this is explained by the fact that vibrating solids divide into *harmonic lengths*, separated by *nodal points* of rest, and that these last are equally distributed at aliquot parts of its whole length. If the whole extent of the walls be in vibration, its angles should come in at the nodal points in order to avoid the confusion arising from different vibrating lengths; and for this reason they are placed at aliquot parts of its entire length. Thus the Hall is itself a kind of passive musical instrument, or at least a sounding-board, constructed on theoretical principles. Whatever is thought of the theory, it proves in practice to possess the excellence which is liable to be lost in the construction of the best designed edifice."

We will conclude, for the present, with giving, as the proof of a necessity for a close adherence to the limits of strict proportion, the instances of the great Hall of the Catholic Institute at Cincinnati, the largest single room on this Continent. The Institute was built before the war, at a cost of one hundred thousand dollars (a sum very inadequate to such an undertaking now), and the Great Hall itself was of such dimensions as to offer a most desirable place for meetings of the masses. But, the one failure of the Architect, was the cause of the utter worthlessness of the Great Hall, and the consequent extra outlay by the stockholders. The width was not proportioned to the length, and the height was so low as to invite the *echo* which took possession, and dividing its forces utterly routed the hopes of the owners. In vain the platform for speakers was remodelled—nothing would do. The human voice divine was most ludicrously mocked several times in its every effort. And the bewildered auditory, if at all superstitious, must have shrunk from the seeming presence of spirit speakers, who thus gave vent to their

jealous fears for their earthly reputation by breaking up the learned argument or pathetic appeal into wild, discordant reverberations. The Architects were consulted, but nothing came of it—the Great Hall was unredeemably a great noisy bore, and had to be unroofed, raised up, and finally transformed into a theatre, under the title of MOZART HALL. Its Architect this time, completely succeeded in giving the public a very perfect theatre, and the deeply disappointed stockholders a better paying investment of their money than did his predecessor, and the Architect of the Great Hall surely learned a good lesson by which we trust he may profit in the future.

GOOD DISINFECTANT.

The articles which science has hitherto presented us with in the form of disinfectants, have had, each and all, some serious drawback to interfere with their general use by the public. Some gave us a most bewildering scent in place of that of which it rid us, being more sanitive, but not more pleasant. Others in destroying disease in the atmosphere brought on asphyxia in the lungs, and in fact none of them were inviting. The knowledge of Carbolic acid has at last given us a better preparation in the form of what is termed Egyptian Powder, suggestive of its ability to drive out the plagues of Egypt. Now we do not consider that we are going out of our path of duty to recommend this as being all that housekeepers would desire, and hospitals should have; a safeguard for the healthy, and an alleviative for the sick, besides being a certain insect destroyer which last characteristic would, of itself, tend to make the Egyptian Powder a most popular article with all housekeepers everywhere. It may be had of the EGYPTIAN POWDER Co., or BAKER, MOORE & MEIN, 621 Market St., general agents.

WOOD PRESERVATIVES.

WE have more than once met in agricultural journals with a receipt for the preservation of fence-posts or posts for framed houses, which in nine cases out of ten, was more productive than preventive of the dreaded decay of the said fence-post. Some would have it that *salt* introduced into a hole bored obliquely into the post below the ground would keep the wood from rotting for an indefinite length of time, if not forever. Others suggested coating the foot of the post to be inserted in the ground with coal-tar. The two suggestions are wrong in principle and while considering this subject we find in the latest number of our able friend the SCIENTIFIC AMERICAN, an exhaustive article on *Coal-tar and its products as preservatives for wood*, which is so much to our purpose that we will take the liberty of transferring part of it to our columns.

After giving a very interesting detail of the failure of the various methods by which wood was impregnated with coal-tar the writer goes on to say: "The causes of the failure are explained by the fact that coal-tar does not yield any creosote, even if treated in like manner as wood-tar, which often yields as much as 25 per cent. of creosote. The substance obtained by the treatment of coal-tar is carbolic, or phenic acid, which differs materially in its properties from the real creosote. Being an effective disinfectant, carbolic acid does not prevent fermentation nor putrefaction; on the contrary, Hirsch, of St. Petersburg, found that some substances impregnated with a solution of carbolic acid showed the formation of mold within a fortnight. This circumstance taken in connection with the fact that coal-tar resinifies and hardens quicker than wood-tar explains the failures observed by Hyett, Stevenson, Heath, and others, when used in a wet place, where the tar cannot quickly

dry and form a hard coating. This also explains why nothing but a hard mass outside remained in the rail-tie spoken of by Bethel, where all wood within was gone leaving the resinified tar as the 'hard, black mass.' Such is similar to the coach-makers relative to hubs, which when painted with oil color before being well seasoned, soon rot on the inside. Experience and science seem to teach that the use of coal-tar or its products is, in most cases, more detrimental than advantageous for the purpose of preserving wood."

The objection to salt as a preservative of wood is that it retains the dampness in the wood, thus inducing and nourishing decay of the fibres and producing what is commonly known as "dry rot."

CLEANLINESS ABOUT THE HOUSE.—As a general rule for living neatly and saving time, it is better to keep clean than to make clean. If you are careful not to drop crumbs of bread or cake on the carpet, you will escape an untidy room, and save the trouble of cleaning it. In working, if you make a practice of putting all the ends of your thread into a division of your work-box, kept for the purpose, and never let one fall on the floor, the room will look very differently at the end of the morning from what it does when this is not attended to. A house is kept far cleaner when all the members of the family are taught to wipe their feet thoroughly on coming in from out of doors than it can be done where this is neglected. There are a thousand ways of keeping clean and saving labor and time which are well worth while to learn and practice, and though they may seem to entail trouble, it is not so with any one of refined feelings, who regard all labor to secure cleanliness a labor of duty and love.

THE WORKINGMEN OF EUROPE.

IN this land "flowing with milk and honey," how little is known of the hard-worked, ill-paid classes of the older Continent. There is not a nation in Europe in which men or women get anything more than mere *slave wages*. In our free and prosperous Republic humanity rules, and all are equal. Labor is paid its due, for we truly recognize the scriptural wisdom that declares the "laborer is worthy of his hire."

How characteristic of the monarchial government is the treatment the toiling millions endure at the hands of their pampered masters.

An observant correspondent of the *Continental Gazette*, writing from Dresden, says:

"One problem in the state of things here puzzles me completely. It is this: how do the working classes live at all on the wages they get? Take into account the German talent for economy, and the undoubted fact that we foreigners pay far more for the same articles than the natives do, and it still remains a great mystery. Look at the wages they get: there is the chambermaid who takes care of my room; she is hard at work in this house from early to late, gets, with food and room, but not with washing, a sum equal to one dollar and seventy cents in gold a month! Up and down these long flights of stone stairs she goes continually; she says, 'I keep all the time one pair of shoes on my feet and one at the shoe-maker's.' Every pitcher of water must be brought from a pump on the other side of the square. She has the afternoon of every third Sunday for a holiday. And clothes, shoes, and every necessity of life beyond mere food and shelter must come out of twenty-one dollars a year! And she dresses tidily, wears a cheerful face, and has as merry a laugh as ever I heard! Or take the

case of a waiter at a good restaurant; his wages are his meals at the saloon and four dollars and twenty cents in gold a month, two-thirds of which he must pay for lodgings. Seventeen dollars a year to keep a man in clothing and all personal necessities! As for gratuities from customers, they are a mere trifle, and most probably go into a common stock with those of the other waiters, so that special assiduity avails him almost nothing. Leaving all other results aside, is it likely that he can afford the luxury of a family? You ask how does he live himself! That is just the problem I cannot solve. But he does live and stands ready to serve you, civil, handy, week days and Sunday, month after month!

"Take the case of musicians. I go often to a concert given every evening at a restaurant. These concerts are well worthy of a full description, and I hope sometime to describe them, for to an American they are unique. But for the present, as to the musician's pay; there is a band of more than twenty pieces, and their music, to describe it no further, is equal to the best orchestral music one hears from the best large band of Boston and New York at a first-class concert. The performers receive all the admission fees, and the proprietor of the saloon makes his profits from his own sales. The average attendance, during a whole evening, is perhaps sixty; the admission fee about seven cents. Perhaps twenty cents a night, at the outside, as the wages of a first-class musician! The orchestra at the theatre and opera here (they form one establishment) is a very large and very fine one. This theatre-opera, by the way, has a reputation throughout Europe; it is maintained by the government, which pays it an annual subsidy, in addition to the receipts from entrance fees

at a high rate of one hundred and fifty thousand thalers—about equal to as many dollars in our paper currency. The leader of the orchestra in this grand establishment gets about six hundred thalers a year. Evidently the rank and file under him receive at most but

small wages. Yet among them are men who perform for nothing, and regularly all the time for nothing, year after year, that they may at last succeed to a salaried place when their turn comes and a vacancy occurs."

IMPROVED TENEMENT HOUSES.

SUCH is the caption of a laudatory notice in the *Hearth and Home* of an imported suggestion for fitting residences for our respectable mechanics and others of humble means. But, we will give the writer the advantage of being heard in his own words:

"It is one of the most difficult things in the world to contrive and build (at present prices of labor and material) a well appearing suburban house, or group of such houses, which shall rent for any respectable percentage on their cost.

"We copy illustrations of some working-men's homes which have recently been erected near London under the auspices of the 'Improved Industrial Dwellings Company,' to meet a want in this direction.

"In its economy of space it may offer some useful hints to our manufacturers or others intending to erect cheap and convenient tenement houses," &c.

These remarks are accompanied by the foreign production of which we can only say we hope no such abominations will ever be erected in this country. A scullery is a thing unknown here and is a special room off of the kitchen for doing the rough work of that department. In it is a clothes boiler, oven, sink, &c.—and in this plan we allude to, a water-closet is likewise located in it. This "closet of all work," as we shall call it, is but five feet six inches wide, and is directly off of the living room, which latter is as crooked and inconvenient an apartment as we ever saw, having but

one window, although it is fourteen feet six by fourteen feet. On the basement flat it has five doors; but on the other two floors it has one less.

The chimneys of the back apartments are in the rear wall and consequently lose one-half of their heat besides giving a very bad draft. Two families are confined to one narrow steep stairs, and there is not a *hall* in the whole building. The architect modestly apologizes for being obliged to put all his tenants under one roof, but gently consoles them with the advantage to the folks on the upper floor that they can have garden beds up on the roof.

Now we would like to know why the *Hearth and Home*, when it assumes to furnish our working-men with tenement homes, cannot find more suitable plans in this country than those with which it seems anxious to furnish us from London. Or why, when venturing on this "most difficult thing," it could not have consulted any professional friend before trying to enclose American free-men in English contrivances wholly unsuitable to the ideas, usages or climate of this country.

No, we can assure the *pseudo* importer of "improved tenement houses" from London, that our architects can construct, on the same dimensions of lot, a greatly superior two story and basement building for tenement purpose, far better adapted as regards convenience, accommodation, light, ventilation and heating, not to speak of *appearance*, which might

be easily made to surpass that of our English designer.

The *Hearth and Home* is an excellent American journal and worthy of commendation, therefore it is we are surprised to see so unworthy an effort to pass over national designers to reproduce in its pleasing columns ideas so utterly foreign to our country's feelings and taste.

USEFUL KNOWLEDGE.

There are apparently trifling things we constantly pass over, because we are not in immediate want of them. Items of information which of an odd time we keenly feel the want of; such, for instance, as the following :

TABLE OF WEIGHTS.

The average quantity equal to a ton of

Chalk.....	14	cubic feet.
Clay.....	18	“ “
Earth.....	21	“ “
Gravel (Concrete).....	19	“ “
Sand (Pit).....	22	“ “
“ (River).....	19	“ “
Marl.....	18	“ “
Shingle.....	23	“ “

The average weight of WATER is as follows :—

- 1 Cubic inch weighs nearly 5 oz.
- 1 Gallon weighs.....10 pounds.
- 1 Cubic foot weighs.....62½ “
(or 6¼ gallons.)
- 35.943, or nearly 36 cubic feet...1 ton.
- 1 cubic foot approximates to.....6¼ gallons.

In the construction of Coal Cellars, Builders will find it useful to know that

- 1 Cubic foot of Anthracite.....58½ lbs.
- 1 “ “ Bituminous.....53 “
- 1 Ton of Lackawanna Coal occupies 45 cubic feet.
- 1 Ton of other Coal from 39 to 41 cubic feet.

CURIOUS EPITAPH.

The following amusing puzzle is found upon the tomb-stone of a lady who it appears was engaged during a busy life-time in the pottery business. It is in style of the “Bill Stump” inscription

which so sorely perplexed the Pickwick Club.

Ben E
At: HT: HIS; ST.
One: Lies: KA
Th ARINE, gRa yc
H ang 'd
: FR. :
Om; abu Syli Fe; tol
IF. — Ele —
SS. CL:
: A yb. ye AR :
— Than —
Dcl : Ays
Hego
Therp Elfa
: ND :
NO WS, HE ' ; S tur
N ' D .. TO EA RT
HH : E R scl : Fy
E WEE P in
Gfr. I. En
D. S. L.
E.t — mea — D
VI
Seab — Ate — yo
: URG :
RIE, Fan
: DD :
Ryy OU Rey
Esf OR WH.
— ATA —
V ai .. LS af lo
oDoft Ears W.
H ok NO : W SB
UTIN, AR UNO
Fy Ear
Sin .. So .. Metall
Pit — C.
Hero — R — broa
: DP :
ANS HE . I.
— NH —
Ers : Hopma
: YB :
E : Aga — IN.

Least any of our readers may suffer through curiosity and not have the patience to gratify it, we give the solution, which is as follows :

“ Beneath this stone lies Katharine Gray,
Chang'd from a busy life to lifeless clay,
By earth and clay she got her pelf,
And now she's turned to earth herself.
Ye weeping friends let me advise,
Abate your grief and dry your eyes
For what avails a flood of tears?
Who knows but in a run of years,
In some tall pitcher, or broad pan,
She in her shop may be again.”

FLOWERS, BEAUTIFUL FLOWERS!

A WRITER, signing himself H., in that excellent agricultural journal, *Colman's Rural World*, discourses on flowers in a style which he who understands as well as loves those special annual gifts of God can do so intelligibly. He says:—

"Surround a man, exhausted by hard labor, with the beautiful, and he will almost forget his exhaustion in admiration, if he has a spark of taste for the lovely of nature in him.

"Our suburban towns and rural places, where labor has necessarily so long held undisputed sway, are annually growing more attractive by the introduction of taste in surrounding the dwellings, etc., with the ornamental as well as the useful. The love and cultivation of flowers has an ennobling and refining tendency: the mind and the heart are made better. The care and culture of flowers, elevate and purify the mind. Children, as well as grown persons, are often inspired with cheerful views of life; and in their culture, their manners and polish are softened, and they become attached to their homes. Wherever we see flowers cultivated, we find a greater degree of intelligence and refinement: children as well as grown persons are more respectful and orderly, so much so that the passing traveller will notice it—he will see all about the premises, the buildings, garden and farm, indications of neatness, order, etc.; an air of thrift, comfort, and good farming, will also be observed.

"The wide-spread and greater love and cultivation of flowers, will give a happy and more enduring love of home, and will affect the character, as well as increase the attractiveness and value of our farms. Instead of seeing our door-yards uninclosed, or with dilapidated fences, where cattle, pigs, geese, hens, etc., are at home—we shall see handsome enclosures, well filled with fruits,

blossoms and the ornamental. These will not only please the eye of the inmates and passers by, but will give character to the occupants, and an increase money value to the farm.

"The care of a garden, the ornamental and the beautiful, is peculiarly adapted to bring back the strength and equanimity of the afflicted in mind or health, and wean from sorrows occasioned by bereavement. The care of flowers will often, by diverting the mind from self, perform cures that medicines of the apothecary can't heal. Few dwellings are there but that a few flowers or climbers, in or out of doors, may be cultivated, and thereby add to, if not entirely change, the appearance and whole aspect of home. It is not my purpose to give an entire list of climbers, plants, etc., suitable for the garden or yard; but if any thing I may write will induce even one to commence their culture, or encourage the wavering—my object will be accomplished.

"Any vacant space may have its appropriate plant; and the good judgment and taste of a person will lead to the culture of suitable ornamental shrubbery, climbers, flowers, etc., where there is room.

"Among the hardy climbers we find the Scarlet Trumpet Honeysuckle, the Yellow Trumpet Monthly and the Evergreen Monthly Honeysuckles. The Virginia Creeper and several species of like climbers, valued for their foliage, are very ornamental to cover buildings and to hide unsightly objects. There are also a variety of climbing roses, such as the Michigan, Baltimore Belle, and others, newer, if not more attractive, which it is not necessary to mention here—the horticultural papers and catalogues will keep you informed.

"The Baltimore Belle has large clusters of pale, almost white, double flowers,

with a waxy blush. A plant trained beside the house cannot fail to attract attention from every one who may behold it when in blossom. The Virginia Creeper, or American Woodbine, is a very ornamental climber; the leaves in the fall assume a rich and gorgeous tint, and it is the most ornamental plant of its genus.

"In order that the garden should retain its beauty and attractiveness throughout the season, there should be

a succession of flowers, and a judicious selection, even if only few in number, to give pleasing variety. Bulbous flowers for earliest; other herbaceous perennials for successors; and some particular bulbous plants and annuals for late summer and autumn flowers, together with plants distinguished for their beauty of foliage. The amateur cultivator will be at no loss what particular varieties to select, to secure a constant succession of flowers and beauty."

INTERIOR ARRANGEMENT OF DWELLINGS.

THE most striking difference between the modes prevalent in England and this country as regards the location of the chief apartments, is to be found in the fact that whilst English city dwellings of every class have the Drawing Room on the upper or second floor, the American houses invariably have these apartments on the lower or first floor.

This distinctive difference between the two great nations arises out of their relative social customs. The English are in the constant habit of receiving company and having large dinner parties, and it is seldom that an English household is without one or more guests at table, save when the family forms the dinner party at some other house. Under this sociable system, by which hospitality and conviviality are ever kept alive, it becomes necessary to provide a suitable room for the assembling of the guests previous to being summoned to the Dining Room, and another desirable apartment for their retirement after dinner, which is the Withdrawing Room, commonly called DRAWING ROOM. The Dining Room being on the first floor, the Parlor is the reception room, and on retiring from the Dining Room, the lady of the house leads the way for her guests, up stairs to the Drawing Room, so that that apartment is secluded from the re-

ception Parlor and the Dining Room, in the latter of which the host remains with such of his male guests as desire to "stand by the bottle" and prolong

"The feast of reason

And the flow of soul,"

And whose festive noises the ladies are but too happy to escape.

Now, we in America have a very different custom. It is seldom, in the great majority of houses, that dinner parties are given, and when they are, the company all retire after the meal and assemble in the parlors, (the second of which is beginning to be called the Drawing Room.) There is no drinking or carousing in the Dining Room, and as that apartment is very frequently in the basement, the parlors are the withdrawing rooms for the party. Indeed, the origin of the word "parlor" being the French *parler*, to speak, or converse, would show that that apartment is properly intended for the purpose for which the Drawing Room is used by our English cotemporaries, and the latter is really not requisite as a part of an American dwelling. In royal palaces the Drawing Room is used as the reception hall, or *salon* of majesty, and to set apart such a room for the reception of guests by a republican people is at best but a paltry effort at copying a part of a whole system which we na-

tionally deery. Yet the second or better parlor may, if thought proper, be styled *par excellence* the DRAWING ROOM. When it is resolved to have such a room in first-class houses, it would be well to bring them as near to the English origin as possible. In city houses it will be necessary to have them on what we term the second floor, but which the English call "first," (they counting by "stories," we by "floors.") And, as our citizens are not over disposed to ascend surplus stairs, however easy of rise, this alone will ever prove objectionable to the complete introduction of the DRAWING ROOM proper. Of course, that apartment will in the suburbs, or country, whether in England or here, be on the first floor, for the simple reason that there is ground space enough for the "spread out" of the plan, which will amply admit of the required form and proportions.

The universal application of sliding doors between parlors gives to our city residences all the advantages of the Drawing Room without the care of its *individuality*. The extra ornamentation and furnishing of the one then may be applied to the others, and thus sustain all requirements of elegance and taste without inflation of plan. A "waiting room" is still necessary, and the fitting up and furnishing of this comparatively small apartment will compensate, on occasions, for the want of an extra parlor, when the two principal rooms of this class are thrown into one, to suit the purposes of a Drawing Room. But, as there are amongst our millionaires and merchant princes, not a few that will have the *bona fide* Drawing Room, it becomes necessary to say a few words on the construction and arrangement of this *salon de mode*, and in so doing we will borrow some features from the English and French models in vogue with the *haut ton*.

If it be desirable to adopt the style of Louis the Fourteenth, the floors should be of various hard woods, highly

polished, with the sides bordered and parquetted.

If the Drawing Room be large and lofty, there should be a *dado*, which with its base and surbase should project sufficiently into the room to admit of bold pilasters. This *dado*, which is in fact a flat pedestal in the same manner as a pilaster is a flat pillar; or, to speak plainer, a *dado* is a slice of a pedestal, and this feature may be continued uniformly around the room, or be broken to answer for the *alto relievo* pedestals of pilasters where introduced. Supposing then the height of the room to the cornice, to be fourteen feet, the height of the *dado* would necessarily be about two feet nine inches; if only twelve feet six inches high, the *dado* would be two feet six inches, or about one-fifth the height of the room from the floor to the upper line of the cornice. Pilasters judiciously arranged, and composed of colored marble, or scagliola shafts, with sienna marble pedestals and caps, and bases of white marble, supporting a cornice of the same, could be made to present a very fine appearance, especially with the addition (in a loftier room) of a coved ceiling, reticulated with silver netting on a cerulean blue ground. But, the taste of the Architect cannot fail to effect all the desires of fancy.

It may be as well to say here, that there are but two orders of Architecture which can be used in interiors, such as we are now speaking of—namely, the Corinthian and the Composite—for these two admit of an amount of ornamentation which the others would not warrant.

The character of the enrichments on the ceiling and cornice should be light and pleasing; the compartments, when the ceiling is panelled, should not be so deeply recessed as in the dining room and library; and the ornaments should be of a gayer and more fanciful description.

Pateræ, or festoons, or paintings of pleasing subjects, or wreaths of flowers might be introduced with fine effect in *al fresco*.

The great obstacle to perfection in the finish of a Drawing Room of the first class will be found in nine cases out of ten in the enrichments not having sufficient relief, the effect being very meager on a lofty ceiling, unless relief be had by means of silver, bronze, or gold. The enrichments that form or surround the several compartments should be well marked and in bold relief. If it be thought necessary to ornament the panels, this may be done by the artist's pencil.

When gilding is employed, it should be used sparingly; for, if overdone, that which would have been elegant will become gaudy and vulgar. If the enrichment to be gilded is large, the prominent parts only should be etched with gold; but of the plain mouldings the smaller ones, or those only that will have a good effect, and will mark more distinctly the form of the general mouldings, should be selected for gilding.

When the ceiling of the drawing room is plain, the color should harmonize with the prevailing tint of the room, and the cornice be relieved by other tints of the same color, deeper and lighter than that of the ceiling.

When the room is low, an acroter, or margin, with light and shade lines, is often run round the ceiling, to make the room appear higher than it really is.

The walls are occasionally painted with some warm tint in distemper, or in turpentine colors of one shade; with margins and light and shade lines to form the sides of the rooms into panels; frequently having ornaments of flowers, foliage, etc., painted in relief, in the angles of each panel, and gold mouldings under the cornice and on the dado, and up the four internal angles of the room; with a smaller moulding round the doors, windows, and chimney pieces. A small gold moulding is sometimes put to the internal edge of the margin, round the panels: a more general style is, to cover the walls with a rich patterned satin paper; the

more expensive kinds being highly relieved with gold, or some inferior metal. This kind of paper is, in a few instances, in good taste, but more frequently in bad. A flock paper, with or without a pattern relieved with gold, may be adopted; or a plain flock may be laid on the walls to any shade of color the employer may approve, giving them the appearance of being covered with a beautiful cloth without a seam: this is often rich and pleasing in its effect; but we must protest against the deep crimson color, which is sometimes seen on the walls of drawing rooms, it kills the effect of the furniture, destroys the light, gay and cheerful character of the room, and leaves all the recesses, and other parts of it, not strongly lighted up, dull and gloomy; light, warm, sunny tints are much more suitable; or even green, which it has become the fashion to use so much again of late, is far better than such a deep heavy color as crimson. When the walls are hung with flock papers, gold mouldings are almost invariably used; but with satin papers, a pattern border in flock, designed to suit the paper, is as frequently put round as gold mouldings.

In drawing rooms of a more stately kind, we would hang the walls with figured silk, or with rich damasked or striped satin; when so hung the walls should be battened and sheeted with boards first, on which canvas should be strained, and then papered, so as to prevent as much as possible all risk of stains from damp or dust, which would very soon destroy the beauty of the satin.

There are many ways of painting these Drawing Rooms; some are done the prevailing tint of the paper, making the styles, windows, etc., a dark tint, the panels a lighter, and the mouldings either darker still, or with a French white, or very pale tint of the same color; other rooms are painted in imitation of some choice wood, but the recent introduction of hanging woods, cut

like veneer, is completely driving out this mode and effectually taking its place with the real woods themselves, so that the choicest effects are now produced. Satin and maple wood are most desirable for grounds, and walnut, butternut, and cherry for borders, etc. Gilt border mouldings are run around the panels; and when the whole is well varnished the effect is most beautiful, and very much superior to papering.

It used to be fashionable to paint rooms French white, with gilt mouldings; and where the mouldings were carved, the carvings were slightly etched with gold. To give additional elegance, the panels of the shutters were filled in with looking-glass.

If the Drawing Room be of a size suitable to its pretensions it must have two fireplaces, and the mantel must be of statuary marble, pure in its whiteness, and designed in perfect keeping with the style of the apartment. This is not always attended to, and ready made mantels are too apt to be forced upon the Architect, without reference to unity, but simply because the design tickled the uneducated taste of the proprietor. As regards the furnishing of the Drawing Room, it should be left to the taste and experience of a responsible upholsterer, subject to the opinion of the Architect. In many cases the lady of the house is apt to follow her own judgment, and this is not unfrequently good, for where woman really possesses taste she surpasses man in this respect, for her perceptions are finer and more delicate, and art seldom fails to acquire beauty under her care.

The carpet may be considered as one of the most important articles of furniture, and much care is necessary in its selection. If the colors be too gaudy and overpowering they will injure the effect of the other furniture; and if too cold, they will give an air of cheerlessness and discomfort. For use and economy the pattern should be rather diffusive than set and formal; the principal

shade being interspersed with gayer and richer toned colors, such as will not easily be injured by dust. Persian carpets are the most splendid of any made in the world. They are gorgeous in the extreme, and where luxury unfettered by economy is to rule, they are unquestionably the most fitting for a first-class Drawing Room. The design of the pattern should be in accordance with that of the apartment.

The hearth-rugs should agree perfectly with the carpet, but bolder; they should be thick, warm, and ample in their dimensions, for if too small, they will give a mean character to the fireplace. The fringe around them, if there be any, should be thick and massive.

Curtains and general drapery, as well as sofas, *tete-a-tetes*, tables and chairs, as well as all the other necessaries and luxuries that go to make up the perfect furniture of a modern Drawing Room, we will not dwell upon, knowing that the cabinet-makers of our day are fully equal to the task of meeting the most extravagant demands of Fashion, and yet preserving a due amount of dignity and taste.

As regards the embellishment of the walls with paintings, we would caution against the admission of subjects likely to create a depression or unpleasant feeling, such as shipwrecks, death in any form. Landscapes of a warm and cheerful tone, historical pictures, portraits of prominent members of the family, and all such pictures as may produce a feeling of satisfaction with the subject, as well as with the ability of the artist, are to be most recommended; for, no matter how exciting the scene may be it is rendered still more displeasing to the feelings when thoroughly brought out by a master hand. We have seen in the brightest drawing rooms, such pictures as the offering of the head of St. John the Baptist, and the effect was the more repugnant to our feelings from the very fact that the revolting subject was the work of an inimitable master.

A Drawing Room cannot be too brilliantly illuminated, this is in fact its most forcible attraction, and as it is *the* special display-room of the ladies, where all of dress and bijoutry is to be set off to the greatest advantage, there should be literally a blaze of light, for the whole effect desired is to dazzle the senses. To aid this last purpose large mirrors in suitable frames, should be liberally distributed and judiciously located throughout.

Frames covered with rich colored velvet, bordered with gilt mouldings, look very beautiful as long as they retain their tone, but when dust, that inevitable intruder, settles upon them, they at once lose their charm, and are quite inferior to *all gill*.

In the foregoing remarks we do not so much desire to declare our own ideas

as to what is or is not *recherche*, as to supply hints founded on observation, to those who will have discernment enough to take them, and make use of them, or to pass them over with a friendly feeling for the intention which prompted them.

The mansions of our wealthy citizens, in town and country, are erected with a laudable desire to advance the art-efforts of our day, and the drawing rooms they contain should be all that modern taste required.

The dwellings of our less wealthy circles should assume their appropriate rank and appearance, and their drawing rooms should be in keeping with the general proportions and display of the house. All efforts to overstep the line of uniformity are productive of but one result—vulgarity

AN AMERICAN ECONOMIC MUSEUM.

THE most useful, practical institution which our Government can boast of is now happily established at the National Capital. The Patent Office is very useful in its way, and not alone educates, but stimulates the great inventive genius of our countrymen. Public Libraries are public blessings, of which all can avail themselves.

The Smithsonian Institute fills, or will yet fill, a most desirable place in the instructive department of the Nation. There are in fact many public foundations of which, as a young republic, we have just cause to be proud. To add to these, and, indeed in one respect, to go ahead of them all, we have, through the untiring efforts (and they surely are patriotic) of Professor TOWNSEND GLOVER, the talented and erudite Entomologist of the Agricultural Department, become possessed of a NATIONAL ECONOMIC MUSEUM, and a collection of insects, birds, grains, grasses, wax impressions of

perishable fruits, specimens of minerals, fibres, etc., etc.

To facilitate the acquirement of the freshest information and completest knowledge in this comprehensive institution, the Professor has inaugurated a complete system of communication with scientific men in all parts of the world, for the purpose of obtaining, by interchange, the results of their experience and observation.

The arrangement and government of this new national institute are such as to make it generally available as an invaluable treasury of most useful knowledge to the great Agricultural and Horticultural as well as Mineral and other productive interests of the country at large. It is composed of three grand divisions.

First.—The Library, containing the history of every product of the United States.

Second.—The samples of the products

of each separate State, accurately labeled in cases.

Third.—The display of all the different materials which can be manufactured from the mineral, vegetable, and animal productions of the United States. It is not possible for any one to fail to see the immense advantages derivable from such a veritable *Republic of Knowledge* as this NATIONAL ECONOMIC MUSEUM at Washington must prove itself to be.

The growing immensity of this wonderful country demands just such facilities of information regarding its wealth of production, that the other parts of the world may have palpable knowledge of facts as they exist. And not alone in that does the utility of this Museum consist, but also in the open treasury of ready information on all subjects interesting to the great army of producers throughout the land. Is a farmer troubled with the invasion of some fly or destructive worm, he has but to send a specimen to the NATIONAL ECONOMIC MUSEUM at Washington, and an examination is made in the cases for a kindred specimen, and in the library for the history of it, together with the surest method of riddance, and this information is transmitted to him.

Should it happen that the specimen is entirely new and unknown, then the search for knowledge begins, on the part of this National institute, by interchange with European museums and entomologic societies. And failing there, to note its advent and preserve its identity.

The mining as well as the manufacturing interests of the whole nation will find here a school of collective information. Every State will be fully represented, if it is not now. Our own far-famed petroleum, for instance, is shown in its various stages of manufacture into refined oil, paraffine, aniline colors, and every one of its available properties exhibited to the enquiring and scientific eye. Glass tubes show the different

successive strata through which it may be necessary to bore to reach petroleum in the various sections of the country; besides giving the full and explicit experience of the borers. The oil-bearing sand-stones are also exhibited, and in no way can the importance and magnitude of the coal and coal oil interest be so completely elucidated.

The practical advantages presented to the Nation by the establishment of such an institution as this cannot be overrated, and soon will prove that its foundation at this time is not a day in advance of the country's requirement of it.

Hitherto our numerous and excellent agricultural publications north, south, east and west, which were the only friends the farmer had to apply to, when puzzled, answered a good purpose as far as their ability or resources of information would enable them, but these were, of course, limited. Here, then, at last, we have a grand National source from which all can obtain their required knowledge; and we trust that our Government will so fully recognize its utility, as to nourish and sustain it to the maximum of its efficacy. No mere politician should be appointed to fill the place of curator in it. Positive ability and adequate education and intelligence, should be the tests of qualification in its officers; for, in them lies the actual power to render this NATIONAL ECONOMIC MUSEUM a living, thriving, useful institution, or a useless dead letter thing to be pointed at as a disgraceful failure, and be cited by our enemies as a proof of the incapacity of Republics to sustain those useful public institutions to be found thriving under the patronage of monarchies.

TO MEASURE GRAIN IN THE BIN.—Multiply the length by the width, and their product by the height in inches; divide by 2,150 (the number of square inches in a bushel,) and the product will give the number of bushels in the bin.

MODERN ATHENS.

THE vivacious correspondent of the *Continental Gazette* (a lady of course) who adopts the title of A BOSTONIAN, and whose delightful gossipings our readers have already been, no doubt, delighted with, writes on May the 4th from the Capital of Greece in the following clear and ringing style:—

“Athens itself reminds me very much of some modern well-to-do American village. The city has for the most part been built within the last thirty years, and, consequently, the buildings all have a fresh look. The streets are generally well paved, and, in the new part of the town, are of considerable width. The currency is, theoretically, one of the simplest. The drachma (equivalent to eighty-five centimes) is subdivided into 100 leptas. This is the whole story. To illustrate, however, the practical currency, I will state the experience of my first morning’s shopping expedition. I made three purchases, paying for what I bought in napoleons. On retiring to the hotel I took out the money I had received in change, and found my receipts as follows: ten copper pieces of ten leptas each and two of the five leptas; two ancient Bavarian thalers; one florin and one quarter florin of Austria; one English sixpence; one rupee of the East India Company; one Mexican dollar; two francs of the Kingdom of Italy; one of France; one five-soldi piece of the Papal States; and last, but by no means least, a genuine American half-dollar. Now as the values of these various pieces in drachmas and leptas were told me when I received them it might seem that it would still be comparatively simple currency. Unfortunately, however, there are two difficulties to be constantly encountered, in the first place you cannot remember the values, and in the second place, you can never persuade people to take these

various coins for the same value for which you received them. The real trouble is a great want of pieces of the value of a drachma. Of these I have only seen one during a week’s stay in Greece. The Government, however, has taken the matter in hand, and Easter week a new coin was issued from the Mint. The name of drachma has been retained, but the value of the piece is altered so as to make it exactly equal to the franc. Of course, at first, these pieces will pass for one drachma and fifteen leptas of the old currency, and for a time, there will be the confusion always incident to a change in currency, but the new pieces met with a most cordial reception, and it will not be long before Greece has a simple and convenient coinage, practically as well as theoretically.

“During our stay here we have made frequent visits to the Acropolis and have been awe-struck at the wonderful grandeur which surrounds that magnificent collection of buildings, even in their present ruined condition. There was here no call for the imagination, as was the case with so many of the ruins of ancient Rome. There is still enough left to show what the Acropolis must have been in the days of Athenian greatness. The finest, or, at least, the most impressive ruins are those of the Temple of Jupiter-Olympus. The Temple of Theseus is the most perfectly preserved ruin I have ever seen, although I think one cannot fail of evincing a feeling of disappointment at the comparative insignificance of the interior as compared with the great size of the exterior. Of course we visited Mars’ Hill, and heard the most clerically inclined of our company read Paul’s matchless defence of Christianity, made long since from this very spot. Nor did we fail to cross the intervening valley and stand opposite upon the bema of the Phyx, and

try to imagine how Demosthenes must have appeared as he stood there addressing the assembled multitudes beneath him. We visited the prison where Socrates used to sit and utter his words of wisdom to his followers, who could look down upon him from that queer aperture in the ceiling over his cell. We stopped to see the Theatre of Bacchus, and tried to imagine the scene when the theatre was crowded to hear one of the plays of Aristophanes given for the first time. We climbed the hill to the left and sat beneath the shade of the tomb of Philopappus, and gazed over now at the Acropolis, which rose just before us, or, turning our eyes seaward, we tried to imagine the fleets drawn up in front of Salamis. We drove out to the Eleusis, and visited the ruined Temple of Ceres, and we could not help experiencing a feeling of curiosity as we thought of those old mysteries which had been for so many centuries celebrated here. We drove out, under an escort of four cavalry and eight infantry soldiers, to the

old monastery at the base of Mount Pentelicus. Taking horses here we ascended, under the protection of the infantry part of our escort, that rough old mountain, which for so many years yielded up marble for a nation, and where the most beautiful marble still remains, sufficient to build a thousand cities yet. We visited the curious grottoes half-way up the mountain, and finally ascended to the summit and gazed down upon the plains of Marathon, which lay immediately under our feet. We gazed down upon them, as I said, but, unfortunately, we did not see them, for we were completely enveloped in clouds, it was raining hard, and we were drenched through. However, they were there, nevertheless, and we *ought* to have seen them, and that was something.

"This afternoon we leave Athens, well pleased with our hotel, our visit here, and the prospect of a delightful sail to Smyrna, from which place you must expect the next letter."

HOT-HOUSES AND NURSERY-GARDENS OF THE CITY OF PARIS.

(From the *Continental Gazette*.)

PARISIANS, like the Athenians of old, are surfeited with the best of every thing; it takes, consequently, a good deal to please or tempt them, and thence that inordinate desire for, and research after novelty so peculiar to fickle Greece and our modern Gaul. The public gardens when first laid out in Paris excited immense admiration, called for enthusiastic cries of delight, and if there was a dark side to the flaming scarlet blossoms from Japan and American foliage it was that this had to be paid for; but, after all, that was the affair of the City of Paris, people paid taxes for something and the good *bourgeoisie* felt proud they could get the tropics in Paris for the small amount required of them yearly, and that remitted by very slight instal-

ments. After a time, however, the population got so accustomed to the admirable decoration of their walks, to have every fallen leaf swept away before them, every grain of sand moistened down, that they took advantage of the very first occasion to complain of the reckless extravagance, lavish, blind, wilful, sinful, and senseless outlay for their health and pleasure. Had not M. Haussmann knocked enough places and tradespeople down without rooting up the gardens of Asia and bringing them here for M. Prudhomme to nurse? Therefore, the susceptible old gentleman and family are not inquisitive on any points connected with hot-houses. They can as well go to ruin without troubling their heads about figures; but not so in-

different is the foreigner, who, on passing before a splendid piece of shrubbery stops to examine it, notes its curious growth, then goes further on, stands astonished before a bed of begonia or caladium, then comes across a pyramid of some other unknown ticket, and determines to ascertain the exact amount of trouble taken, of time and money spent in varying these exotics for exposure in the open air.

There is so much to learn and to be seen in Paris, nevertheless, and visits to the edifices are so arduous, though pleasurable, that when the three last days to be spent in this capital draw near there is a general scuffle to feed the mind to the detriment of the body, and even then a vast number of places are scratched out of the tourist's note book: a number of questions to be made remain in the position of an interrogative hook on the mind, and a variety of institutions are left unexplored that are doomed to be eternal loads on one's conscience all through after life. We wish to free our readers of so much future remorse, albeit we have all been taught that a vexed spirit is as good a state for us as that of the honored martyr who was toasted on a gridiron; but we implore our readers to avoid it. It is easily done by paying a visit to the hot-houses of the Muette while they may be seen, for they are exceptionally open at present to the public gratis, and this permission does not extend beyond a fortnight, of which about one half has already expired.

The cost of the constructions terminated at La Muette in 1865, was 311,000 fr., including the heating apparatus (steam), since then eight low Dutch houses have been added for the multiplication of rare plants and their weaning. These works cover one hectare of land. Some of the hot-houses are excessively high in order to locate arboriferous camelias, palm-trees, &c., but, as the visitor will not fail to observe, they are still too low and altogether too

crowded for the proper display of the very perfect specimens here on view. The delicate perfume of the atmosphere in this department is penetrating; the strangely-shaped trees, some of which, the *Pandanus* species, grow in spirals (turning round their stems like a staircase made of fans), cause the visitor to roam far away and think of lands seen in fairy tales. Here, too, is one haunted with dreamy associations of childhood, when, with the Bible on her lap, an elder sister would teach our small girlhood all about the fig-trees of Palestine, the date-trees in the desert, and call the *Urania speciosa* the "traveller's tree," explaining that the stems are hollow and contain a delicious liquid to quench the thirst of the weary. A splendid specimen of this *Urania* is at the Muette; no less last 150 different species of the *Pandanus*, and 250 of the palm and coconut trees. I will only mention the *Cycas*, the *Areca*, and *Latania*, all in their native forests the shelter of gorgeous parrots and humming birds. After the exotics the next stop should be at the azalea show, of which there are from eight to nine hundred species. A house has been consecrated to their special beauty. It is square; all round it are rows of raised steps—the front ones being low, the back ones ever raising higher as in an amphitheatre. The variety of the collection can be imagined when it is known that there are ten rows of these tiers. The transparency of the white azaleas is almost indescribable; the streaked, striped, and variegated are unique—perfect bushes. The appearance of this department can only be described as an arena in which Flora's loveliest are in silence, as beauties should always be, but fighting out a terrible battle on their high seats. There is no languishing droop of the head here: all are "going best" in their way; some with a blush, others crimsoning, the pale ones borrowing a tint from their companions, but all close together, not to set each other off, but to prevent the

singling out of either. The manœuvre is successful, and the visitor is forced to admit that all are equally beautiful; he does this with a sigh.

The pride of the hot-houses is of course the production of multicolored foliage from the tropics, among which in the Dutch houses the *caladium* and *begonia* are the most remarkable. They have most appropriate names; thus, one splendid leaf forms a goblet, such as any *bacchante* might have held. It has a carmine streaked hollow and veins; its rim is of a lovely green; its stem is a flexible handle, and the name given it is *caladium Siebold*. The *caladium Boieidieu* and *caladium Meyerbeer* are no less rich. The *begonia* are in greens and browns of the most curious cut, speckles, and prick; the myrtles bear clusters, and jasminstars scent the air with the perfume of orange blossom. The fernery alone is a study.

On crossing the grounds to visit the collection of new roses in the open air, we come to a miniature pond, but on it floats the pure white nymphaea with wax-like petals and golden heart; she is a queen, and her loves are above the tide. Further on bend slender rushes towards the yellow flags, shaking their loose petals to buzzing insects, which collect in full swarms and force under them—as men would under a banner: a world is this little pond.

But here are the roses. Firstly, we will mention *King David*, because he is laden with perfume; he has in his person all the sweets of an eternal race; then, the *Triumph of Alençon*—not lace ladies—a full pink rose,—but we must own a spider was weaving a web around it as delicate as the finest Alençon any of you are veiled in on a bridal day. *Auguste Mie*, a very pretty old French name, for *mie* means *amie*, and an *august friend* supposes many charms. The name is not ill-chosen, for however lovely this aristocratic rose she is almost scentless—too august to be charming entirely. The *Gloire de Dijon* is a

magnificent tea-rose, with the perfume of a peach. A bow to her, and we pass on; we dare not trust our persons too near for fear of captivity. Hats down also to the *Empress of the French*, a full rose with deep pink blush on the outside of every petal and white satin lining within. The *Lion of Battles* is most glorious; a red rose when it opens from the bud, but it turns purple as it advances in life, and dies crimson blue—reddening at its weakness to the end. The *Queen of Violets* is less a rose than a large violet in the shape of a rose. The *Banner of St. Louis* is a real flag; each petal fans the breeze. *Napoleon III.* is a rose in the style of the *Lion of Battle*, only that its shape is that of the camelia. It would extend this article beyond prescribed limits were further details given, but there is still much to communicate on the decoration of public walks in Paris as viewed at its source. One word of advice. The best way to get to the Muette is to take a ticket at the St. Lazare Station for Passy. After a ten minutes' walk from the Passy terminus, along the fine piece of land belonging to Mme. Erard, the visitor is at the entrance of the Muette in the Avenue d'Eylau. LEBEUF-DOLBY.

COLORED ALABASTER.—An extensive bed of this most beautiful material, so useful in elegant art, has just been discovered near Rome. That similar beds exist in this country, we entertain not a doubt; for, gypsum is an article of commerce. It is the coarser species of white or grey color which is used in agriculture, and where the one is in such abundance, it is highly probable the finer and vari-colored sort may yet be found. Gypseous Alabaster is not susceptible of polish like that beautiful transparent article of which vases, statuettes, &c., are formed. Yet it is capable of being worked if not polished like marble, its brittleness being the reason for the preference being given to the latter.

A NIGHT OF HORRORS ON MONT ST. BERNARD.

SOME of your readers may be intending to visit the Great St. Bernard during the coming summer. I subjoin the following account of our visit there last season, by which they may be influenced in deciding whether or not to pass the night with the "pious monks of St. Bernard":—

Last summer, after a long day's walk, a party of graduates of Yale University arrived towards nightfall, tired and hungry, at the Hospice of St. Bernard, expecting a good supper and a comfortable night's rest. The day had been very sultry, and we had suffered intensely from the heat, but no sooner had we got near the summit than we began to feel bitterly cold. We were hospitably received by the very handsome and polite monk in attendance, and got a tolerably good supper; after which we tried to get warm by clustering around the wood fire in the dining-room, but as the fire was small, and the company was large, we could not succeed, and so we went to our room at seven o'clock to go to bed, in order to keep warm. It was a large room with six beds, five of which were soon filled by our party, and we bade each other good night and snuggled under the bed-clothes with the intention of sleeping. Mistaken idea! No sooner had we got nicely warm than there was a simultaneous cry of horror, and five young men in light clothing leaping frantically from their beds stood shivering and groaning in the midst of the floor. *The beds were alive!* Not one, but thousands, perhaps millions of little creatures, beautiful in their structure but detestable in their habits, were sharing our couches with us. They were *fleas*—real, genuine, half-starved, blood-thirsty, Italian fleas. They were each of them individually and separately the undoubted original wicked flea whom no

man had ever pursued. Certainly if they had been pursued they had never been caught, for there they were, lively and agile as ever, rejoicing over their prey, while *we*, poor unhappy wretches, what could we do? If we remained out of our beds we were nearly frozen by the intense cold; if we got into them again we would be literally devoured. As it was about a thousand of our little friends had accompanied each of us on our *sortie* from bed, and were determined not to desert us in any case. So back we scrambled again between the sheets and awaited the attack of the enemy, who soon turned out in full numbers. Many of those on the outposts were captured and killed, but without any visible effect on the main body. Our side then resorted to strategy by retreating from one bed to another, and, finally, the whole party had collected in the sixth and vacant cot, which we trusted had not been already seized by the blood-thirsty foe. But, alas, we found there an ambush, which made terrible work with us. It is said "*l'union fait la force*," and according to that proverb we had hoped that being all five in one bed we would be better able to defend ourselves, or that at least four of us might escape, trusting that the foe would choose *e pluribus unum*, the *unum* being the one whom they found the most palatable morsel. But no, our strategy was unsuccessful, so we each retired to our (bed) posts, and tried smoking them out, but without success. At this moment one of the party discovered in his knapsack a bottle of powder warranted to kill all sorts of insects. In an instant our beds, our clothes, and ourselves were sprinkled with the powder, which was more welcome to us than its weight in gold. But alas for *fleeting* hopes. The powder was *there* and our enemies were *there*; they walked about in it, they

examined it, they appeared to be pleased with it, and they sent for all their relations and friends and acquaintances to come and look at it,—and they came, and they all appeared to like it, but it had no effect on them at all except to render them rather more playful than otherwise. The man that sold us that powder was a cruel-hearted impostor; how we longed to have him with us to see him FLEE-ced himself. At last we gave up—we were beaten, conquered, overcome, vanquished. Do your worst, ye fiends! we cried—and they did. One fellow tried to sit up all night but was nearly frozen into an icicle, and finally had to re-enter the enemy's camp in despair. That was a night of horrors!—such a night as I trust never to pass again. How the “pious monks of St. Bernard” can stand their fellow inmates I cannot imagine. They might well sing that old hymn which I have

heard so often, “*Flea like a bird on the mountain.*” About five o'clock, the next morning, five pale and unhappy men might have been seen descending the road from the Convent with faltering steps—*weak* from fatigue and loss of blood, but *strong* in the determination never again to be beguiled into passing a night at the Hospice of St. Bernard or any other equally charitable and *public* house of entertainment. In the meantime, allow me to suggest to the monks of St. Bernard a suitable inscription to be placed over the door of their large room with six beds (on the second story), which was the one occupied by “*les Misérables*” on their visit. Certainly, there is no inscription which to us seemed, more appropriate than that of Dante over the gate of the Inferno—

Per me si va nell' eterno dolore,

* * * *

Lasciat' ogni speranza o voi ch'intrate.

PASQUA.

FROM NAPLES TO GREECE.

WE left Naples on Sunday evening, April 25th, at eight o'clock, on board the steamer Palermo, of the Italian Steamship Company. We were soon leaving beautiful Naples far behind us. The moon was shining brightly as we left the Bay, and I can never forget the last view we obtained of the city just after passing between Capri and the main land. The boats of the Italian Company seem to be built mainly for the accommodation of gentlemen, and—while, therefore, excellent staterooms are provided for them, there are only two small cabins, each holding eight persons, intended for the comfort of the ladies. There is, however, on the deck a small room with four berths corresponding to an officer's stateroom on the Ocean steamers. This we were fortunate enough to secure for the ladies who were with us, but all the other ladies were obliged

to suffer in the close cabin below the deck. Twenty per cent., in addition to the regular fare, is demanded for this upper stateroom, and the extra trouble of engaging it a few days previous to sailing. On coming upon deck the next morning I found that our course carried us close by the ever-active volcanic island of Stromboli, from whose summit the white smoke was rising as we passed. We were furnished with a most elegant *déjeuner* about ten o'clock and about noon we saw that we were rapidly approaching the coast of Sicily. Like all travellers, we were eager to behold the far-famed Scylla and Charybdis of ancient days; but our enthusiasm was a little damped on discovering that, although we passed between them, they were still in reality nearly seven miles apart. The spot where the whirlpool of Scylla is said to have been

is at present designated by a rock passed just before entering the Straits of Messina, while the rock of Charybdis lies about seven miles further south at the entrance of the harbor of Messina. Three o'clock saw us safely anchored. No such convenience as a wharf was to be found, so we were forced to land in little boats. Arrived on shore, a nominal examination of baggage took place, and we were soon safely quartered at the Hotel Victoria. We found this a very comfortable house, kept by a German, and we were also delighted to find here some excellent Vienna beer.

The town of Messina contains a population of about 65,000. The harbor is commodious and excellently well protected by a long peninsula, which stretches around, almost completely encircling it. There is, however, but little in the town to detain the traveller. The ascent of the Telegraph, or Colle di San Rizza (1,500 ft.), enables one to obtain an excellent view of the Straits and the northern shore of Sicily. The cathedral also deserves a visit, if one has time enough to spare.

We found that the steamer of the Messageries impériales line was expected to arrive from Marseilles about midnight; so, leaving word to be called in season, we retired early to rest. About one we were awakened by the report that the vessel had arrived; so, making a hasty toilet, we soon found ourselves at the custom-house, where we were obliged to wait till the official *in attendance* could be roused from his comfortable nap. After waiting in the cold for about a quarter of an hour, that worthy functionary made his appearance, and informed us we could proceed. Embarking in a small rowing-boat, we soon arrived on board the fine steamship Eridan, advertised to sail at half-past three. We found the vessel very crowded, but the officers seemed desirous to do the best that could be done under the circumstances, and, although three of our gentlemen were obliged to content them-

selves with mattresses placed in the dining-saloon, still we were made very comfortable during the voyage. Longer time than had been anticipated was required to take on board the cargo awaiting us, and even when we finally sailed, at half-past five, over four hundred boxes of oranges were left behind on the lighters. About seven we passed the southern point of Italy, and were soon leaving the land far behind. The afternoon of the next day (Wednesday) the Greek coast came in sight, and we were soon off the Gulf of Coron. A little further on and we passed Cape Matapan, the most southern Cape of Europe, and, before we retired for the night, we had passed between the island of Cerigo and the main land, and, turning the vessel's bow northward, we were rapidly approaching our destination. About five the next morning we anchored off Piræus and were soon on our way to the shore. Arrived there, we were most politely received by a custom-house officer, who stood patiently by till our baggage was all placed upon a wagon, and then he very quietly informed us that, if we did not give him two francs, the trunks must all be taken from the wagon and examined. Such an outrageous attempt at imposition I was never before a witness of, but, of course, we chose to submit rather than to undergo such an additional delay. The money was accordingly paid, and we were soon riding towards Athens in the comfortable carriages of the English Railway Company who have built and manage the railroad which connects Athens to the Piræus. I learned that the affairs of the company were most satisfactorily managed, the stockholders receiving about thirty per cent. in dividends annually. A short ride of twenty-five minutes brought us under the shade of the Acropolis. We found the hotels crowded with Americans and English, but we were fortunate enough to secure comfortable rooms at the Hotel d'Angleterre.

The next day being Good Friday was

universally observed as a fast-day. The stores were all closed and services held in all the churches. In front of each altar was placed a table, covered with a black pall. This was supposed to represent the Holy Sepulchre. During the day the worshippers, on entering the churches, would purchase, for a small sum of money, a rose of the attendant priest, and deposit it on this bier. At eight o'clock in the evening, solemn services were held in all the churches, and at nine four priests taking the pall, which by this time was completely loaded with flowers, left their respective churches, and followed by their congregations, each member bearing a lighted candle, proceeded to make the circuit of their various parishes. The effect of these torchlight processions, now seen in the distance and now passing each other in some open square, was very striking. Returning once more to their churches, a short service of prayer was held, and the day thus brought to a close. Saturday was devoted to making preparations for the following day. Every family killed a lamb, and those whose means were too limited to allow of such an expense joined with others. At eleven o'clock at night the bells of the various churches began to ring, as a summons to attend the Easter service. Having arrived in front of the cathedral we had a large platform erected, on which was an altar and two candlesticks, each holding twelve unlighted candles. Near by a band of music was stationed, and several companies of soldiers were drawn up around the altar. The interior of the church itself was very dimly lighted by one or two tapers burning near the crucifix. The crowd about the church grew denser and denser. Exactly at the first stroke of twelve, here and there in that vast assembly a lighted taper could be seen; rapidly the lights spread from their several starting points, and in less than five minutes every one in that immense multitude held a lighted taper in their hands. The same change

took place within the church also. The transition from darkness to light was very striking and impressive. The priests now came out from the church bearing the pall, as on Good Friday, and also a reversed crucifix. Having descended the platform, a few short prayers were said, and the pall was folded up and the crucifix was elevated to its proper position. Immediately the band struck up, the cannons boomed forth, the bells rang, and every one turned to salute his neighbor, no matter whether it was an acquaintance or not, with the words "Christ is risen." A choir of voices struck up the resurrection hymn. This having ended, the procession returned again to the church, and the services were thus brought to a close. On our way home, if we could trust the testimony of our olfactory nerves, we detected, as we thought, signs of an approaching feast. Nor were we mistaken, for our guide informed us that on arriving home every one ate immediately a large bowl of rich soup. This morning, in most of the public squares, crowds of the poorer people could have been seen, and in the centre of each was a large bonfire, in front of which a lamb was roasting, which had been provided at public expense for these poor people, whose purses were too limited to allow them to indulge in such a luxury. At all the corners of the streets colored eggs were for sale, and at the hotel for breakfast we were treated to Easter eggs and roast lamb. As I write the constant firing of crackers, pistols, and guns, the blowing of horns, and ringing of bells, all remind me of one of our Fourth of July celebrations, and I can hardly imagine that I am really witnessing a religious festival in Greece. At twelve o'clock we shall attend the service of the Russian church, where we expect to hear the finest Easter music which is given in the Greek church. Adieu, then, for the present, and expect another letter.

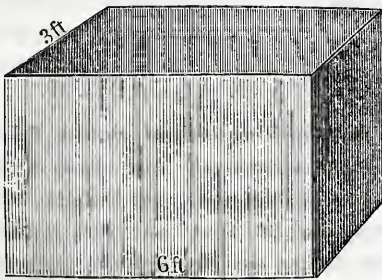
USEFUL ITEMS.

CAPACITY OF CISTERNS

For the preservation of rain water falling on roofs, to be applied to use for any purpose it is desirable that the cistern should be of proper capacity, and especially when the cistern is to be constructed in the upper part of the house. In the latter case the weight should be considered as well, least an undue weight be laid upon the walls and timbers, and the consequence be injurious to the building. It is very necessary therefore that both the weight and capacity, according to form and dimensions, be taken into account in the planning of a building. With this view we lay before our practical readers the following simple rules for obtaining the required information.

A SQUARE OR OBLONG CISTERN.

Multiply the dimensions together; and the amount multiply by 1728; Divide the whole by 231, and the result is the capacity of the cistern in gallons.

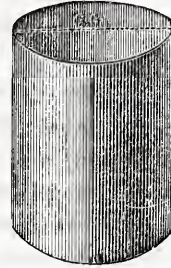


Example. A Cistern 6 feet long, 3 feet wide and 3 feet high, is equal to 54 cubic feet, which multiplied by 1728 is equal to 93,312 cubic inches, and that divided by 231 (the cubic inches in a gallon) gives, very nearly, 404 gallons as the capacity of the cistern in question.

A CIRCULAR CISTERN.

The difference between the rule for calculating this and the preceding lies

in the finding of the square of the diameter.



Example. Diameter 3 feet, height 3 feet. The square of which is 9 feet, which multiplied by 7,854 decimals of a foot gives 7 feet and 0686 decimals, and this multiplied by the height, 3 feet, makes 21 feet, 2056 decimals. Reduce this to inches by multiplying it by 1728, and divide the amount by 231, the answer will be 158 gallons and a decimal equal to $\frac{3}{4}$ ths of a gallon.

AN ELLIPTICAL CISTERN.

Here there are two diameters to be multiplied together, and then multiplied by 7854 gives 4 feet and 7124 decimals, which multiplied by the height (3 feet) gives 14 feet and 1372 decimals. Reduce this to square inches by multiplying by 1728 decimals, and it gives 24429 square inches, and 0816 decimals of a square inch. Divide this amount by 231 (the number of square inches in a gallon) and the answer will be 105 $\frac{3}{4}$ gallons.

As a gallon of rain water weighs just *ten pounds*, a cypher affixed to any of the foregoing answers in gallons will present the weight of water contained in the cistern.

COAL ASHES make decidedly the best covering for walks and road-ways, altogether superior to gravel, although not presenting quite as handsome an appearance.

ITEMS FROM EUROPE.

THE *Paris Continental Gazette*, which is always well posted on all subjects of interest to the world at large, gives us the following:

RAILWAY COMMUNICATION WITH THE EAST.—The Suez Canal is rapidly approaching completion, and the Viceroy of Egypt regards the opening as a matter of so great political importance that he intends to invite personally to great festivals, which he prepares in honor of the event, the Sovereigns of those empires which are most interested—namely, the Sultan, the Emperors of Austria and France, and the Queen of England. It is likely, however, that in a few years a still shorter road to the East will be open by the construction of the Turkish railways, the cost of which is to be defrayed by the great loan of 800,000,000 fr. which Daoud Pasha has succeeded in negotiating in Paris. These railways will run from Brood, on the Austrian frontier of Bosnia, to Serajewo, and further to Nissa, from which one branch will be conducted to the port of Salonichi and the second one to Constantinople. It is intended to continue the Turkish railway system in the future through Asia Minor and the valley of the Euphrates to Basra, on the Gulf of Persia. From Brood the line will extend to the northeast, in the shortest direction through Austria and Switzerland to Paris. Portions of the system are existing already, others are in construction or conceded. The line from Paris to the Sea of Constance is already in management, and that from Feldkirch, in the upper valley of the Rhine to Innsbruck will be regulated by a peculiar law, which is now under consideration by the Austrian parliament. The difficult passage over the Brenner from Innsbruck to Sterzing, is long since finished. From Sterzing or Brixen, through the valley of the Rienz, over

Innichen, along the Drau to Villach, a railway is already projected, and will be constructed by the Austrian Southern Railway Society, next year. From Villach to Klagenfurr, Marburg, to Sissek, on the Save, the communication has existed for some years; only 70 miles remain to be completed. The track between Paris and Constantinople deviates very little from the direct line between these two capitol. The construction of this great continental railway will not be difficult, and in general not expensive. All who comprehend the great political and economical advantages to be secured by these great lines of trade and commerce will desire the speedy completion of so great an undertaking.

The *Patrie* announces on authority that the Suez Canal will be ready for use on the first of October, and that the formal inauguration will take place on the 16th of the same month. France, England, Austria, Italy, and Turkey will send naval squadrons to take part in the ceremony.

A STATE AQUARIUM.

A national aquarium would fail to meet the wants of our far-reaching country; so, the next best thing is State institutions of that nature: and we would wish to see Pennsylvania lead the way by the formation of an aquarium worthy of her position as the Keystone State. Massachusetts and New York would soon catch up the hint and work upon it. See how old Europe does these things.

"There is now preparing in Berlin what will be the most magnificent aquarium in the world. It is situated in the centre of the principal promenade of the city, and will make a large three-story building. It is to be under the charge of Alfred Brehm, one of the best Ger-

man naturalists. The second story will be devoted to the aquarium proper, while the upper floor will contain mammalia, birds and reptiles. The sides of the cages towards the visitors will be of such thick glass as to resist the stoutest serpent or crocodile. The aquarium will be lighted, while the galleries where the visitors stand will be dark. Caves and grottoes abound, and art is exhausted to mimic nature. One portion of the aquarium proper will contain the denizens of the Baltic Sea, another of the Atlantic, and a faithful copy of the Grotto of Capri will be peopled with Mediterranean fish. This aquarium is ten times larger than that of Hanover, and twelve times larger than that of Hamburg—the two most famous in the world.”

A BOSTONIAN, ABROAD writes very interesting letters to the *Continental Gazette*, out of which we are tempted to cull a racy sketch of a visit to the celebrated *Blue Grotto* of Capri.

“The next day at half-past ten, we took the train for Castlemare, which we reached in an hour and a half. Here we found about twenty drivers, all of whom insisted on being allowed the privilege of driving us to Sorrento, asking for that honor the modest sum ranging from ten to twenty francs. Having been previously informed about the tariff we stated it to be our intention to pay seven francs and no more. Seeing that we were posted up on the subject, not another word was said, and we were soon on our way to Sorrento. A most delightful ride of an hour and a half brought us to the door of the Hotel Tromontane. This house, situated on a high cliff overlooking the bay, is kept by two English ladies, and is one of the nicest houses I have found in Europe. The town itself is far more beautifully situated than Naples, and if the traveller has a week to spare, there is no spot more lovely than this to spend it in. How-

ever, the case was different with us, and so, having lunched, we started in a boat, rowed by four men, for Capri. We were assured that it would not take longer than five hours for the whole trip, and that we should be back at six o'clock, in ample time for *table d'hôte*. No sooner, however, had we passed the rocky cliff of Massa than we found ourselves fairly out to sea, with a fresh wind blowing dead ahead, and a very respectable sea to be encountered during the entire passage. All but two of the party were very sick, and at six o'clock, the time when we should have been preparing for a nice dinner at Sorrento, we found ourselves sailing into the Bay of Capri. Here we were obliged to change boats, and be towed three-quarters of an hour more to the northern point of the island, where the entrance of the Blue Grotto is situated. Here we again changed boats, this time getting into a little low skiff capable of holding two persons besides the crew, which consisted of a queer little old man, evidently the captain, and a younger fellow, who did most of the work. We found the entrance to the grotto to be a small narrow opening, possibly three feet in height, and every few minutes completely hidden by the waves. As I neared the aperture, lying flat on the bottom of the boat, I felt very much as though I was bound on a turnpike leading to destruction. Up and down we bounced in front of that horrible cliff, till at length, just as one wave receded and before another could come, the old man gave a shout and whiz we went, tossed in by the approaching wave, amid the applause of the rest of our party, who were waiting anxiously to see us go in or—down! We found ourselves inside of a large cave, 40 feet high, 165 feet long, and 100 feet wide. The water was of a most peculiar and indescribably dazzling blue color; on splashing the surface with an oar a bright silvery appearance was produced. The brilliant coloring of the sides and ceiling was,

however, not present to the degree which is usually seen in paintings of the interior. After rowing about for a few minutes we neared the entrance and shot out in the same miraculous manner as we had gone in. After all the party had thus proved undeniably that they were not born to be drowned, we started back for the boat, and, about half-past seven, bade good-bye to Capri. Fortunately, the moon had come up and the sea had gone down, so that our passage back was somewhat pleasanter than our trip over."

ST. CLOUD AND ITS PALACE.—St. Cloud is one of the most beautiful of the environs of Paris—also the most frequented

by the Parisians. The palace has not been always a Royal domain; according to M. Louis Ulbach, the Contrôleur générale Hevard formerly owned it: Mazarin, that proud, ambitious, cardinal statesman, whose life is an epitome of political intrigue, gilt-edged with pseudo patriotism, who was envious of this princely residence, went to the owner, to whom he said: "This estate must have cost you 1,200,000 crowns." "My Lord, you have greatly exaggerated my means." "Well, then we will say 100,000 crowns?" The controller of finances bowed, but the next day he received 300,000 francs, with the announcement that his château had passed into the hands of the Duc d'Orléans.

FIRE-PROOF LIBRARIES.

IF there is one public building more than another that demands to be unquestionably free from the possible invasion of the most destructive of elements it is the Library. Of this we have had painful proof in the irremediable losses sustained in the burning of the library of Congress and that of the Smithsonian Institute at Washington, the losses of those institutions at Portland, Chicago, and St. Louis.

Are there not many other libraries throughout the country to-day that stand in constant peril of fire?

Filled with most combustible material, even though walls of stone or brick, and roof of iron enclose the treasury of knowledge, the floor of wood, the partitions and shelves of the same material, will aid the incipient spark and ensure destruction. How absolutely necessary then is it for the Architect to avail himself of every possible safe-guard, and to reject all inflammable material in the construction of the library.

The places for the keeping of records, such as Registry Offices, are, to a great

extent, fire-proof. Why not our public libraries? Floors should be of marble, or encaustic tile. Walls should be hollow and "hard-finish" plastered on the brickwork, without studding or lathing. Ceilings should be of iron, as should the roof itself, and lastly, the receptacles for books, with their shelves, should all be of enamelled iron. In fact the one only inflammable thing about the library should be the books and folios themselves, and even these could be so located as to be non-communicative.

Many of our public Libraries, such as the "Astor," New York, the "Philadelphia," in this city, are not open at night, and consequently do not run the risk that the majority do. But this is one of the objectionable points about the libraries in question. They are thus exclusively for the use of those whose leisure will permit them to use them. The great body of the community are practically excluded, and such public institutions are thus conservative in more ways than one.

CORRESPONDENCE.

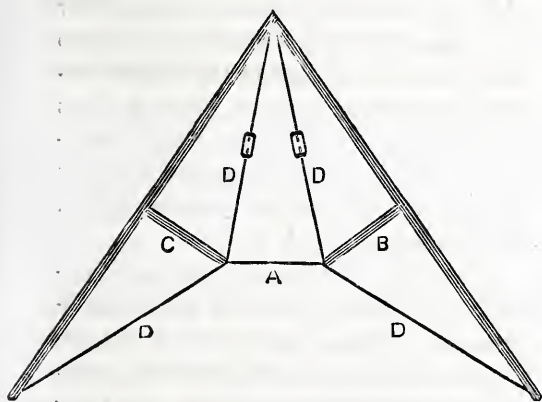
It must be distinctly understood that we do not hold ourselves accountable for the opinions of correspondents.

WILLIAMSPORT, PA.,

May 26th, 1869.

DEAR SIR:—In the construction of a roof of a span of forty feet, or more, what objection is there to the use of *iron rods* for ties in places of wood tie beams?

A. S. W.



ANSWER.—In a span of forty feet we see no objection, but we would not recommend it for a greater span.

The greatest amount of tension would be on the horizontal rod *a*, which would be relieved by the brace pieces or struts, *b* and *c*, which, while they sustain the rafters in the middle of their length (acting as purlines), also hold the ends of those rafters and prevent the outward thrust. The horizontal tie rod is sustained from the apex by the suspension rods *d, d, d, d*, which are continued to the feet of the rafters and there secured to iron shoes.

A roof entirely of timber might be constructed on this plan, embracing all the great requisites of a framed truss, combining at once strength with lightness and economy.

We regret that we received our correspondent's favor too late to afford us an opportunity, this month, of going

more fully into this highly interesting subject.

We will soon, however, canvass its merits, and show how a much greater span than that here proposed may be covered by a roof on the same or similar principles.

MR. EDITOR:—The ARCHITECTURAL REVIEW has so far proved itself fully deserving of public support, which I sincerely trust it is receiving. If any proof were required of its utility, such can be found in the fact that now our daily journals, as well as our literary serials, are paying attention to the subject of ARCHITECTURE, which hitherto was not the case. In fact, whilst PAINTING and SCULPTURE have never ceased to draw out the great or small criticisms of Bohemian taste, the vast art of beautiful construction utterly failed to find the most insignificant place in their enlightened imaginations. Not alone has the REVIEW produced this salutary state of things, but it has drawn other publications forth whose aim is to develop the same great subject.

All this is matter for congratulation; for, the more the public is mentally fed on this subject, the greater will be the appetite for more; and this increasing patronage will beget improvement, until we will find ourselves at last catching up to our European co-laborers in the effort to make ARCHITECTURE a subject of study for the many, instead of a thing for the languid admiration of the select few.

Nor is this the full extent of your REVIEW's mission: It is evident that practical construction has its share of attention, and this is no mean feature of your pages, let me tell you. The

working man who gives the labor of his mind and body to this subject has a just right to his share of the feast of information, and that not in highly-spiced scientific generalities, but in plain digestible matter, comprehensibly useful.

Now, sir, what I desire to see next, is a palpable interest displayed by the Architects and Builders here and abroad, in the communication of their share of knowledge to the general fund. And I am surprised that this effort has not made itself more apparent before this. It is for their interest to sustain the cause of their profession, and if they are too indolent, apathetic, or, shall I say, *selfish*? as to stand aloof when so fair a field is offered them, they surely cannot expect the public at large to respect either their profession or its *pseudo* professors. In the numerous medical periodicals of the day we see men of learning and high standing constantly giving or asking for instruction through their columns; and do Architects and Builders pretend to say they have nothing to ask or communicate?

Can it be possible that so wide and so diversified a subject can be allowed to stagnate for the want of current ideas to keep it fresh? The time is coming, I predict, sir, when the question of general information and free interchange of thought on Architecture will force itself upon society in spite of the ignorance or indifference which still enchains it.

ART LOVER.

WILMINGTON,

June 15th, 1869.

MR. EDITOR:—Will you oblige a subscriber and his friends by stating in the next number of your excellent REVIEW the distinction (if any) between a "champher" and a "splay?"

Very truly yours,

C. J. S.

ANSWER—A *champher* differs from a

splay chiefly in the fact that the former is the cutting off of a square corner or right angle, taking from each side equally; whilst a *splay* is unlimited in this portion to be taken from one side; the slope or angle being of any degree.

To speak of splayed jambs as champhered jambs, is, therefore, very incorrect.

GRATES AND FENDERS.

WILLIAM H. JACKSON & Co.,
31 East Seventeenth street, New York, have favored us with a portfolio of fifty-six engravings of their manufactured grates and fenders. The designs of these luxurious addenda to the dwelling (whether palatial mansion or cozy cot) are perfect as the plan on which they are constructed.

An additional folio illustration accompanies the foregoing, printed magnificently in colors. It represents the *low down grate* in which the fire rests upon the bars level with the floor of the apartment. This arrangement restores once more the good old comfort of the "hearth fire," and we hail it with delight. Under these fire bars is an ash-flue into which the ashes of the consumed coal fall and are easily carried off from an ash-pit door at the bottom (in the cellar beneath). In order to form a draft under the fire a pipe underneath and parallel to the flooring, runs into this ash-flue, and this is controlled by a valve rod having a sunk handle in front of the hearth-stone. The smoke escapes through holes pierced in the covered head of the iron grate-back, into the chimney flue.

The whole arrangement is unexceptionable, and for parlors and first floor rooms generally cannot but be desirable.

Messrs. Jackson have done much for domestic architecture in blending comfort with taste and leaving nothing to long for in their speciality.

QUERIES AND RESPONSES.

A. A. C.—Martinsburg, W. V., asks us to give some information regarding the construction of wooden spires for churches, or to call on any of our readers to render this service.

We should be very glad indeed to receive any communication on this, or any other practical subject from those competent to give it, and should insert such communication most cheerfully. Meantime we will get ready an illustrated article on the subject of framing spires, as soon as our engravers can get the necessary cuts ready.

C.—The brick sidewalk is unquestionably a great nuisance, as you say. We would add that it is much worse by night than in the daytime; for where the bricks are worked out of place the unhappy pedestrian is but too apt to stub his toes against them. We also assent to your record of surface side-drains as intolerable. The day may yet come when such things will be finable, and some respect paid to the understandings of the wayfarers.

J. J. B. WOODSIDE, New Jersey.—We like the spirit which dictates your letter, and wish that the majority of the working classes could be induced to make an effort with the pen. Every one has some mite of information to offer and no one should dread the ordeal of publication. We will be accountable for such useful hints appearing in proper trim. If they are useful they will be considered interesting by our readers, it is no matter how plain their language may be. But unless you have something to say, better wait till you have. Mere words strung idly together conveying no sense are a stunning nuisance.

A. N.—Washington City, D. C. Will accept our thanks for his excellent contribution, which we trust is but the initiation of others from his hand.

J. L.—It is our intention to give all information where calculations are called for, in the plainest language, so as to be generally understood. We have always deemed it a fault with English mechanics' journals that they deal too much in algebraic signs, and thus render their good articles incomprehensible to the mass of their readers. They seem to speak only to those who know as much as they do.

S. A.—Yes, the word *spile* is as correct as *pile*. There is no such word as *pry*, to raise up; the right word is *prize*, although the former expression is in common use, yet like *cornish*, used vulgarly for *cornice*, it is incorrect. These words have got such a strong hold that it would be a hard task to drive them out of use.

W. T. R.—It is not such a difficult matter to calculate the amount of water in a pipe. A pipe of one inch in diameter, and one yard in length, contains $28\frac{1}{4}$ cubic inches, or very nearly a pound of water.

Hence the following practical rule is generally used to find the quantity of water in a pipe of any diameter.

Square the diameter of the pipe in inches, and you have the weight of water in pounds per yard of the pipe's length; shift the decimal point one place to the left and you have the quantity of water in a pipe of any given diameter per yard in gallons.

W.—Sea-sand is bad for mortar to be used in walls of houses; for the salt it contains will always draw moisture from the atmosphere and render such walls damp.

V.—We thank you. It is our intention to give an article on cements for external use, and will be thankful to any of our practical readers who will send us any information on the subject.

A SUBSCRIBER wishes to know the difference between what is termed *malleable* and what is called *wrought* iron.

Iron that is worked to such a state that it may be beaten or drawn out under hammers, or be compressed by rolls, is then denominated *malleable* to distinguish it from *fusible Iron*. And Malleable Iron that is hammered or rolled into different sizes and finished off, ready for sale, is termed *Wrought Iron*, to distinguish it from articles made of *Cast Iron*.

LIGHTNING RODS are viewed by some people as more dangerous than otherwise, the philosophy of Dr. Franklin to the contrary notwithstanding. That

many instances of buildings being "struck" which had on these supposed safe-guards is, as our correspondent F. states, perfectly true. But it is also true that the mischief accruing from the stroke was not owing to the presence of a conductor so much as to the fact that the conductor was made on a bad principle and secured to the building in such a manner as to ensure the destruction caused by the fluid leaving its legitimate course and following the more eccentric one thoughtlessly provided for it in the connection with the building.

The fact is the science of manufacturing lightning rods is but little attended to, if understood.

PUBLICATIONS.

PRINCIPLES AND PRACTICE OF ARCHITECTURE, By S. E. LORING and W. L. B. JENNEY, Architects.
Chicago, Cobb, Pritchard & Co.

It is a courageous thing to attempt the publication, in the West, of such a work as this before us containing forty-six folio plates of Churches, Villas, Cottages, Tenement houses, and humble dwellings for the poor, accompanied by plans and details. Yet here it is, a fine Royal Quarto elegantly bound in cloth and worthy of a place on any boudoir table. The subject matter is judiciously treated and suitably presented in clear type on good paper. Both the authors are well known in the West—Mr. LORING having made his mark at Buffalo, and Mr. JENNEY in Cincinnati, in the years before that violent *breach of the peace* which drew out the patriotism of our professional brethren, and with a host of others, made Mr. JENNEY an efficient officer of Engineers. We congratulate Messrs. L. and J. upon the success of the elegant production before us, and fervently hope that the public will endorse our judgment by rendering a profitable verdict in favor of its spirited publishers.

It may be had in this city of CLAXTON, REMSEN & HAFKELINGER.

THE WESTERN MONTHLY for June comes from Chicago with an average amount of interesting reading. The illustrated biographic sketch is of WILLIAM BROSS, Lieutenant Governor of Illinois, and one of the hardest workers in the production of the growth of the "Garden City." This number concludes the first volume and has a title page and index.

Reed, Browne & Co., Chicago, are the publishers.

THE SCIENTIFIC AMERICAN comes weekly to us with its never ceasing supply of knowledge worth having. We cannot but feel proud of this journal, so far ahead of any rival in its line even in old Europe.

THE PRINTERS' CIRCULAR for June is beautiful in typography, and very interesting in its literary array. Taste, sense and solid worth, are evidently its guiding stars, and so long as it keeps them in view so long will it continue to be a credit to the trade.

THE MANUFACTURER AND BUILDER.—The June number of this excellent friend of progressive mechanic knowledge is an improvement on its preceding issues. The articles are all useful and clearly written. The illustrations are excellent.

The M. and B. has our best wishes for its well deserved success.

THE CONNECTICUT GENERAL HOSPITAL FOR THE INSANE. The Trustees of this excellent institution have sent us their Third Annual Report, in which the want of further accommodations is said to be painfully evident. We hope that the State Legislature will not fail to meet the want and appropriate an adequate sum for the purpose. It is pleasing to see that a library and reading room, together with other means of recreation, have been provided for the unfortunate inmates by a few liberal gentlemen. A fine organ has likewise been added, the purchase of private donations; and although a large State appropriation has been made by a former Legislature, it is to be hoped that the good work will not be suffered to languish through want of still further legislative assistance.

THE JOURNAL OF PRISON DISCIPLINE AND PHILANTHROPY, No. 8, has the Annual Report of a Society instituted in our city so far back as 1787, or "when we were under the king." Need we say that it is well known and its meritorious efforts at alleviating the miseries of the unfortunate inmates of public prisons are felt and esteemed? Truly it is such institutions as these which teach us to respect our fellows and to glory in the fact of civilization; and this journal of its annual experience demands perusal at the hands of every one who feels an interest in society and its members, whether suffering from the ways of error or not. He who claimed the penitent thief as His, taught this great lesson even in his dying hour.

THE GARDENERS' MONTHLY for June is on our table, filled with the choicest articles, short and readable. This publication is peculiarly desirable to all who look for hints rather than prosy disquisitions on the subject which so delights every one of taste. Who would be without a garden, if he could but have it? and, having it he wants and surely should have the next necessity—our friend before us—THE MONTHLY GARDENER.

THE
ARCHITECTURAL REVIEW
AND
AMERICAN
BUILDERS' JOURNAL.

VOL. II.—Entered according to Act of Congress, in the year 1869, by Samuel Sloan, in the Clerk's Office of the District Court of the United States, in and for the Eastern District of Pennsylvania.

MONTHLY REVIEW.

THE LONDON BUILDER AND OURSELVES.

IN a tolerantly critical notice of the REVIEW recently published in the *Builder*, we find an effort to substantiate a charge formerly made by it, and replied to by us, on the subject of "trickery" in the construction of the exteriors of American buildings. The *Builder* reiterates the charge and points to Grace Church, New York, in proof of the truth of it. That marble edifice, he avers, has a wooden spire, crocketed, etc., painted in imitation of the material of which the body of the church is constructed. Alas, we must acknowledge the wood. And we will make a clean breast of it, and still farther acknowledge that at the time that Grace Church was built, our land of wooden nutmegs, and other notions, had not an architectural idea beyond the wooden spire, and that our city and country churches, that aspired at all, were forced to do so in the national material of the day. That said sundry spires of wood were of necessity, painted, is most true; and furthermore, white-lead being a great favorite with the people generally, [when our manners, customs, and tastes were more immacu-

late than in these degenerate days of many colors,] that pigment was the ruling fashion. That the color of the marble, of which Grace Church's body is constructed, should be similar to that with which said ecclesiastical edifice's spire was coated, is unfortunate; but, that the resemblance goes to prove any attempt at a *cheat*, we most strenuously deny. Grace Church is of a by-gone taste,—an architectural era which we now look back to in order to see, by contrast, how far we have advanced in architectural construction. Trinity Church, New York, was the first great effort at a stone spire which our Architects ventured to rear. And although hundreds have followed its lead, none in this soaring republic have gone so near to heaven as that yet. But the thing once effected is sure to be improved upon.

We are not at all abashed then, to own to the *wooden spire painted to imitate stone*, which crowns the steeple of old Grace Church, New York. And the less annoyance should it give our most sensitive feelings, when we reflect that

the dome of the great St. PAUL's, London, is no less a delusion and a cheat, it being of wood, coated with lead and painted on the outside, having a false dome on the inside, considerably smaller than the external diameter would naturally lead the confiding observer to expect. The body of St. Paul's is of stone. Why, according to the requirements of the *Builder*, is not the dome, like that of the Pantheon at Rome, likewise of stone?

Do we suppose, for an instant, that Sir Christopher Wren was guilty of a deliberate cheat in so constructing it? Certainly not. He used the material which he considered best suited to his purpose and his means. And so we should, in charity, suppose did the Architect of Grace Church, New York.

The *Builder*, like too many of our English consins, who do us the honor of a visit, falls into error in supposing that wood is generally used for ornamentation of exteriors. In none of our larger cities is this the case. And when that critical and usually correct authority says, "Even the Fifth avenue itself is a sham as to much of its seeming stone-work," it displays a melancholy absence of its uniform discernment, judgment, and sense.

The only other constructive material to be found on the fronts of the Fifth Avenue, New York, besides marble, brown stone, or pressed (Philadelphia) brick, is in the gutter, which is either of zinc or galvanized iron, and forms the upper portion of the cornice.

Porches and Hall-door frontiseses, of every style, are of marble or stone, and never of wood. Pediments and all trimmings around windows are invariably of stone. In fact we are not a little surprised at the apparent want of information on this subject by so well posted an observer as the *Builder* is acknowledged to be. Some twenty years ago the taunt might be most truthfully applied to our efforts at architectural construction, but to-day the "trick" of

painted and sanded wood would be hissed down by our citizens who claim to live in residences the majority of which are greatly superior to residences of the same class in London, as far at least as material is concerned. No, no—criticism to be useful must be just; and to be just must be founded strictly on truth unbiassed by prejudice.

We do not desire in these remarks to throw the slightest doubt on the good intentions of the London *Builder* in its monitorial cheek, but our wish is to correct the erroneous information which it has received, and which has led to the mistake under which it evidently labors.

We as utterly despise any falsehood in construction as our honestly outspoken contemporary, and will at every opportunity disclose and denounce its adoption in this country in all cases where there is any pretension to architectural design. For a new country like this, it is at least creditable that, even in a small class of dwellings, the architect is, as a general thing, called on to design and frequently to superintend—every thing is not left to the builder as in London. Yet there is and always will be in this as in all other countries a large class of private buildings outside the pale of legitimate taste; creations ungoverned and ungovernable by rule. But such should never be taken as examples of the existing state of the constructive art of the day; they should rather prove the unfortunate exceptions to the fact of its position. Even these it will be our duty to watch over and try to set right; for we are ardent believers in the influential power of information, and look with assurance to the education of our people generally on this subject of judgment and taste in building as the infallible means of turning to good account the remarkable progress in that constructive art of the American nation, which the observant London *Builder* notices with the generous well-wishing of a kindly professional brother.

THE MANSARD MADNESS.

OF all the intellectual qualifications which man is gifted with, there is not one as sensitive as that which enables him to discern between what is intrinsically good, and what is bad or indifferent to his eye. Yet are there none of all man's mental attributes so frequently and so grossly outraged as is this to which we now allude, called Taste.

Custom has much to say in the question of arbitrary rule which taste so imperatively claims. Persistence in any thing will, of necessity, make itself felt and recognized, no matter how odious at first may be the object put before the public eye, and ultimately that object becomes what is commonly called "fashionable." This apparent unity of the public on one object is variable and will soon change to another, which in its turn will seem to reign by unanimous consent and so on *ad infinitum*.

In Architecture this fickle goddess, Fashion, seems to reign as imperatively and as coquettishly as in any or all the affairs of this world of humanity. That which was at first esteemed grotesque and ridiculous, becomes in time tolerable and at last admirable. But the apathy which sameness begets cannot long be borne by the novelty worshippers, and accordingly new forms and shapes remodel the idea of the day, until it ceases to bear a vestige of its first appearance and becomes quite another thing.

Of all the prominent features of architecture that which has been least changeable until late years is the "roof." The outline of that covering has been limited to a very few ideas, some of which resolved themselves into arbitrary rules of government from which the hardest adventurer was loath to attempt escape.

Deviating from the very general style of roof which on the section presents a tri-angle, sometimes of one pitch, sometimes of another, but almost universally

of a fourth of the span, the *truncated* form was to be found, but so exceedingly sombre was this peculiar roof that it never obtained to any great extent, and indeed it presented on the exterior a very serious obstacle to its adoption by architects in the difficulty of blending it with any design in which spirit, life, or elegance, was a requisite.

There are occasionally to be found in Europe, and even in America, examples of these truncated roofs, but it is very questionable whether there are to be met with any admirers of their effect.

The principle on which they are constructed has, however, a very great advantage in the acquirement of head-room in the attics, giving an actual story or story and half to the height, without increasing the elevation of the walls. The architects of the middle ages took a hint from this evident advantage, and used the truncated roof on their largest constructions. Its form is that of a pyramid with the upper portion cut off (*trunco*, to cut off, being its derivation.)

MANSART, or as he is more commonly called MANSARD, an erratic but ingenious French architect, in the seventeenth century invented the curb roof, so decided an improvement on the truncated that it became known by his name. This roof adorning the palatial edifices of France soon assumed so much decorative beauty in its curb moulding and base cornice, as well as in the dormers and eyelets with which it was so judiciously pierced, that it became a source of artistic fascination in those days in France; and as Germany was indebted to French architects for her most prominent designs, the Mansard roof found its way there, and into some other parts of Europe.

But, much as English architects admired, as a whole, any or all of those superb erections of the Gallic Capital, it

was a century and a half before it occurred to them to imitate them even in this most desirable roof.

Our architects having increased with the demand for finer houses and more showy public buildings, and having parted company with their Greek and Roman idols to which their predecessors had been so long and so faithfully wedded, and acknowledging the necessity for novelty, ardently embraced the newly arising fashion and the Mansard roof arose at every corner in all its glory. At first the compositions which were adorned with this crowning were pleasing to the general view, if not altogether amenable to the strict rules of critical taste. But in due time (and alas that time too surely and severely came) the *pseudo* French style with its perverted Mansard roof palled upon the public taste for the eccentricities its capricious foster-fathers in their innate stultishness compelled it to display.

Some put a Mansard roof upon an Italian building, some on a Norman, and many, oh, how many, on a Romanesque! Some put it on one story erections and made it higher than the walls that held it, in the same proportion that a high crowned hat would hold to a dwarf. Some stuck on towers at the corners of their edifices and terminated them with *Mansard domes!* Some had them inclined to one angle, some to another; some curved them inward, some outward, whilst others went the straight ticket.

The dormers too came in for a large share of the thickening fancies and assumed every style or no style at all. The chimney shafts were not neglected. Photos of the Thuilleries were freely bought up, and bits and scraps of D'Lorme were hooked in, to make up an original idea worthy of these smoky towers. "Every dog will have his day," is a fine old sensible remark of some long-headed lover of the canine species, and applies alike to animals, men, and things. That it particularly applies to that much abused thing called the Man-

sard roof is certain, as the very name is now more appropriately *the absurd roof*.

Fashion begins to look coldly upon her recent favorite, which in truth "has been made to play such fantastic tricks before high Heaven, as make the angles weep;" and it is doomed.

A few years hence, and we will all look back in amused wonder at the creations of to-day, crowned with the tortured conception of MANSARD.

HYDRAULIC CEMENT.

The rapid hardening under water of the cement which from that property derives its name of "Hydraulic Cement," has been, and indeed is still, a subject of discussion as to the true theory of such action. We find in the June number of the *Chemical News* a paragraph which must prove very interesting to manufacturers as well as to all who use and take an interest in that most useful of building materials to which the Architect and the Engineer are so deeply indebted.

"In order to test the truth of the different hypotheses made concerning this subject, A. Schulatschenko, seeing the impossibility of separating, from a mixture of silicates, each special combination thereof, repeated Fuch's experiment, by separating the silica from 100 parts of pure soluble silicate of potassa, and, after mixing it with fifty parts of lime, and placing the mass under water, when it hardened rapidly. A similar mixture was submitted to a very high temperature, and in this case, also, a cement was made. As a third experiment, a similar mixture was heated till it was fused; after having been cooled and pulverized, the fused mass did not harden any more under water. Hence it follows that hardening does take place in cement made by the wet as well as as dry process, and that the so-called over-burned cement is inactive, in consequence of its particles having suffered a physical change."



DESCRIPTIONS.

IRON STORE FRONTS, No. 5.

BY W. J. FRYER, JR., NEW YORK.

THE elevation, shown in the accompanying page illustration, shows an iron front of five stories, having a pedimented centre frontispiece of three stories in *alto relievo*.

The style, though not in strict accordance with rule, is showy, without being objectionably so, and goes far to prove the capabilities of iron as a desirable material in commercial Architecture, where strength, display, and economy may be very well combined.

Such an elevation as this, now under consideration, could not be executed in cut stone, so as to produce the same appearance, without incurring a much greater expense, and in the event of a continuous block of such fronts, the balance of economy would be wonderfully in favor of the iron, for the moulds could be duplicated and triplicated with ease, whilst the same composition executed to a like extent in stone would not be a cent cheaper in proportion. Every capital and every truss, and every fillet, should be cut in stone independently of each other, no matter how many were called for.

It may be very well to say that stone is the proper material, according to the long-accepted notion of art judgment, and that iron has to be painted to give it even the semblance of that material, being, therefore, but a base imitation at best. All very true. But, nevertheless, iron, even as a painted substitute, possesses advantages over the original material of which it is a copy, rendering it a very acceptable medium in the constructive line, and one which will be sought after by a large class of the community who desire to have this cheap

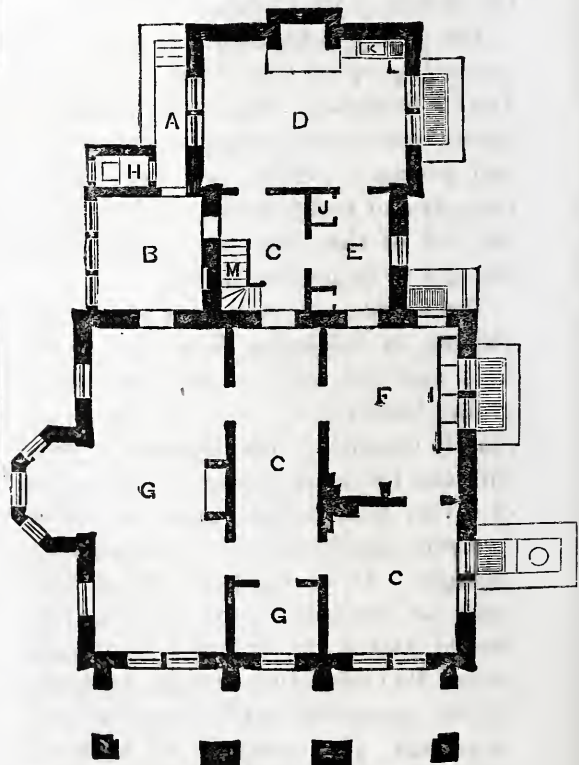
yet practical material, even though it be not that which it represents. As a representative it is in most respects the peer of stone though not identical.

SUBURBAN RESIDENCE IN THE FRENCH STYLE.

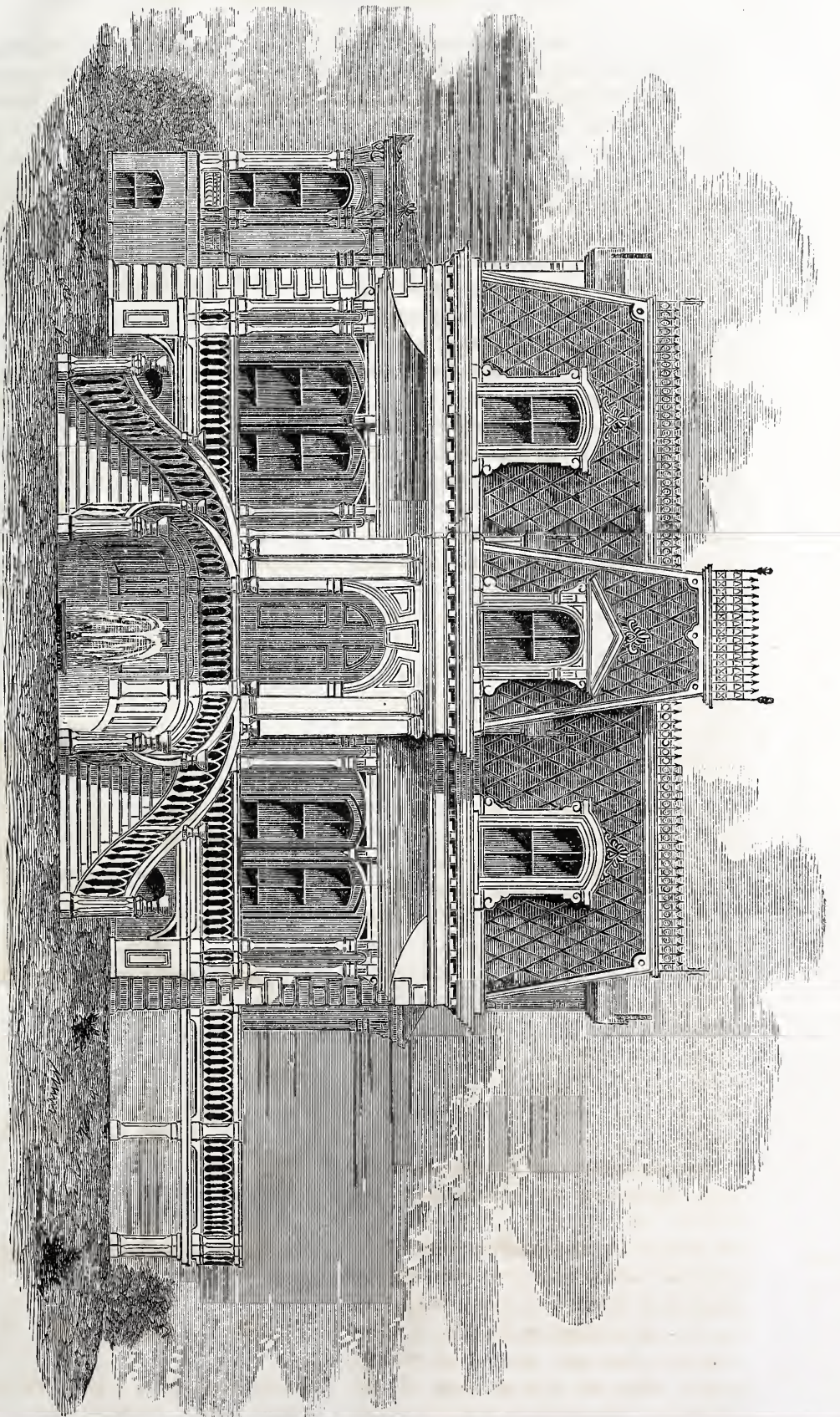
BY CARL PFEIFFER, ESQ., ARCHITECT, N. Y.

THIS design is of one of those homes of moderate luxury wherein the prosperous man of business may enjoy in reason the fruits of his energetic toil. There is nothing about it to indicate presumptuous display, but rather the con-

FIG. 1.



tented elegance of a mind at ease, surrounded with unostentatious comfort.



SUBURBAN RESIDENCE IN THE FRENCH STYLE.
CARL PERLEPPE, ESQ., ARCHITECT, NEW YORK.

On the westerly slope of the Palisades, and two miles to the west of the Hudson, this residence was built by one of New York's retired merchants.

It is sixteen miles from Jersey City, in a town of but a few years growth, named "Terraflly," in Bergen county, and stands on a hill commanding some of the most charming pieces of pastoral scenery, occupying about thirty acres laid out in lawns, walks, gardens, &c, and tastefully ornamented with shrubbery, having a fountain on the lawn in front of the house (as shown.)

The approach is from the public road, by a drive through a grove of about ten acres of stately trees, passing by the side of a pretty pond formed by the contributions of several streams and making a considerable sheet of water. About the middle of this pond the sides ap-

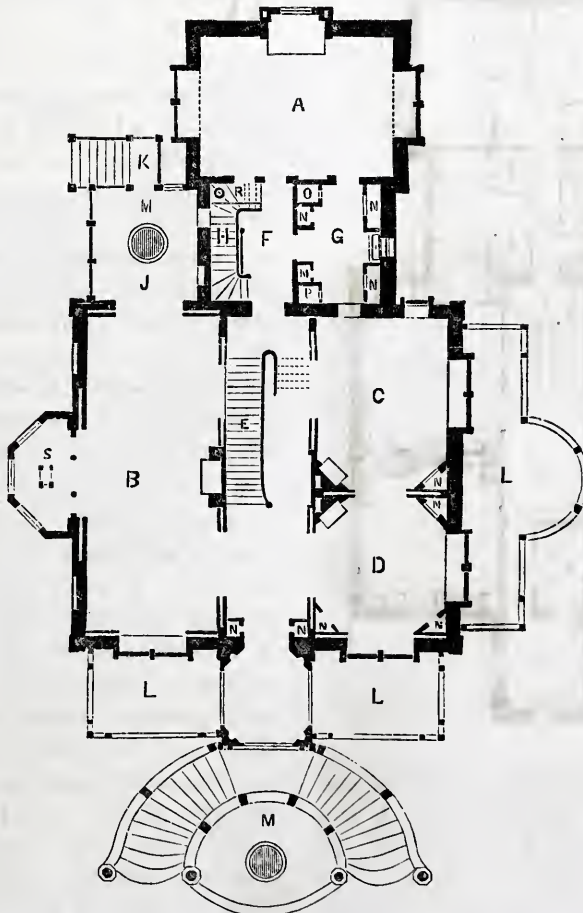
proach so near to each other as to be spanned by an artistic little stone arched bridge which leads to the garden.

From the house one looks on a lovely panorama of inland scenery. The Palisades towards the east, the Ramapo mountains to the northwest; and looking in a southerly direction the numerous suburban villages and elegant villas near New York may be seen.

The house is constructed of best Philadelphia pressed brick with water-table, quoins, and general trimmings of native brown stone neatly cut. It stands high on a basement of native quarry building stone and has for its foundation a permanent bed of concrete which likewise forms the basement floors, as well as a durable bedding for the blue flagging of Kitchen and Laundry hearths.

The arrangement of plan is admirably

FIG. 2.



calculated to conduce to the comfort of the family. It is as follows :

Fig. 1 shows the plan of the basement. A, steps and passage leading from Yard. B, Servant's Dining Room. C, C, C, Coal Cellar and Passages. D, Kitchen. E, Pantry. F, Laundry. G, G, Cellars. H, Water Closet. I, Wash tubs in Laundry. J, Dumb waiter. K, Wash-tray. L, Sink. M, Back stairs.

Fig. 2 shows the plan of the principal story. A, Dining Room. B, Drawing Room. C, and D, Parlors connected by sliding doors with the Drawing Room through the hall. E, Principal staircase. F, Back Hall. G, Butler's Pantry with dumb waiter, plate closet, wash-trays, &c. H, Back stairs. J, Conservatory. K, Steps leading down to Yard. L, L, L, Verandahs. M, M, Piscinæ.

FIG. 3.

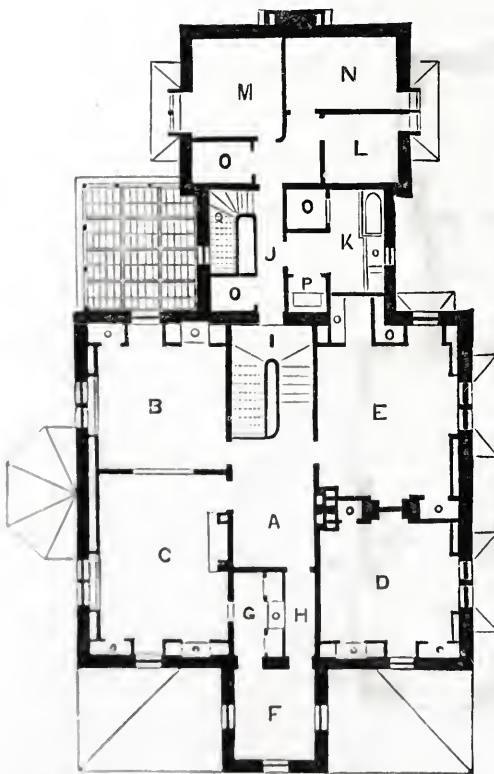


Fig. 3 shows the arrangement of the Chamber floor, or second story. A, the Hall. B, C, D, and E, Chambers. F, Boudoir. G, Closet. H, Passage to Boudoir. I, Half landing connected

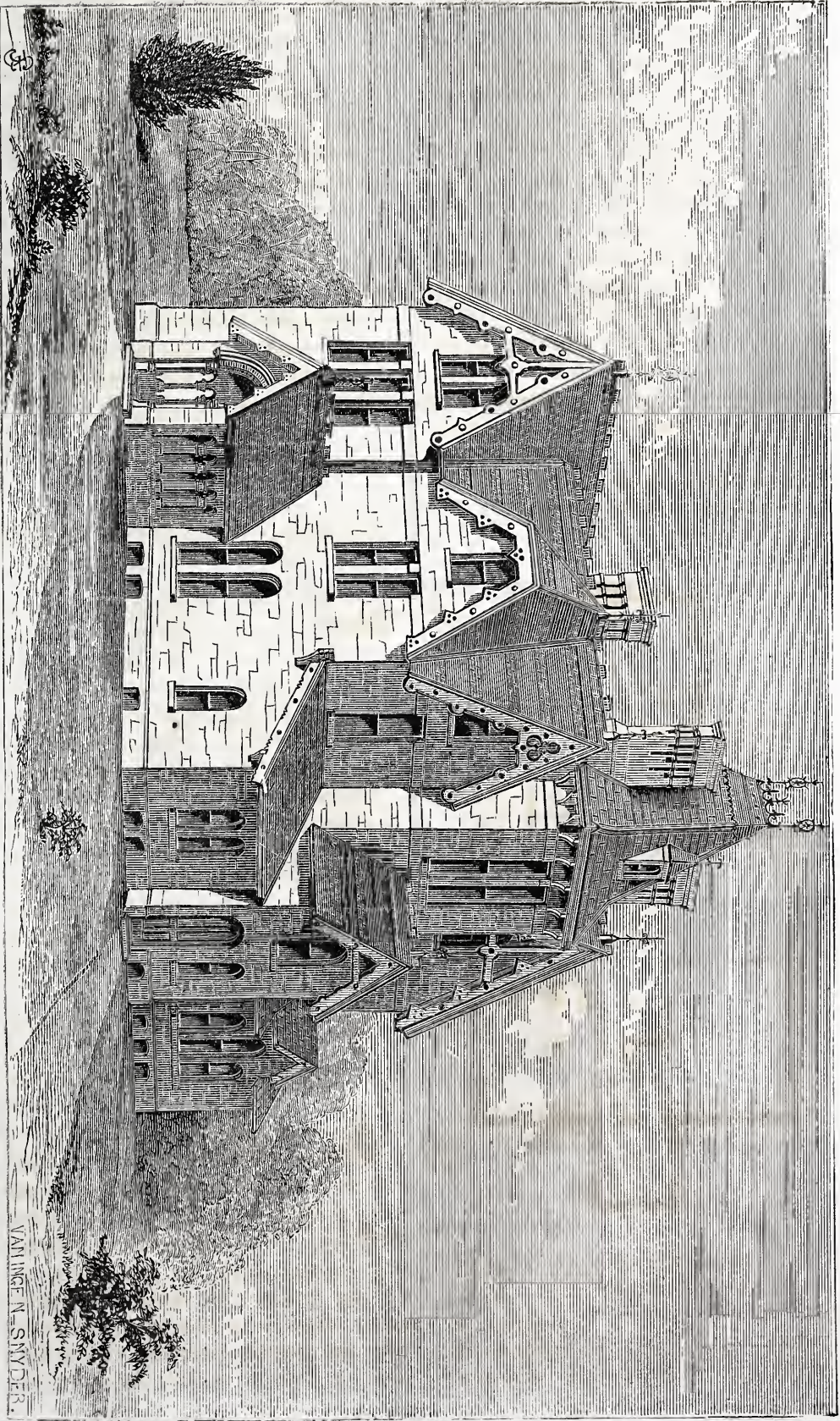
with rear addition. J, Back passage. K, Bath Room. L, M, N, Servant's Bed Rooms. O, O, O, Clothes Closets. P, Water Closet. o, o, o, o, o, o, Wardrobes in the several Chambers. These occupy the angle enclosed by the slope of the Mansard, thus leaving the walls of the chambers plumb.

The roof is flat, and is embellished at the curb with a rich traceried iron balustrade, making a safe and desirable promenade platform. All the accessories that go to make a comfortable home are provided, and the whole forms a model retreat from busy life to Nature and her charms.

SUBURBAN RESIDENCE IN THE FRANCO-GOTHIC STYLE.

WE here give a perspective view of a capacious suburban residence, showing the marked effects of light and shade produced by means of Gothic gables on a building of a square plan. A hipped roof on such a plain form would make a most uninteresting mass of heaviness. The judicious addition of bay windows is always desirable in such compositions; and the hooded gables give a pleasing quaintness to the whole. We present, on next page the principal floor plan, which is somewhat unusual in arrangement, but comfortable, as such form of house is always sure to be.

A, The Porch, pierced on each side with open lights. B, the Hall, in the form of an L, and receiving light from the roof. C, the Drawing Room, with its capacious bay window. D, a Parlor. E, Library and Study. F, Side Hall, with door, under stairs, communicating with passage leading to study; (or, there may be a door opening directly into the study from the side hall.) G, Private Stairs. H, Principal Stairs, under which is a door communicating with the passage to study. I, the Kitchen. J, Pantry. K, the Dining Room,



SUBURBAN RESIDENCE.

VAN LINC N. SNYDER.



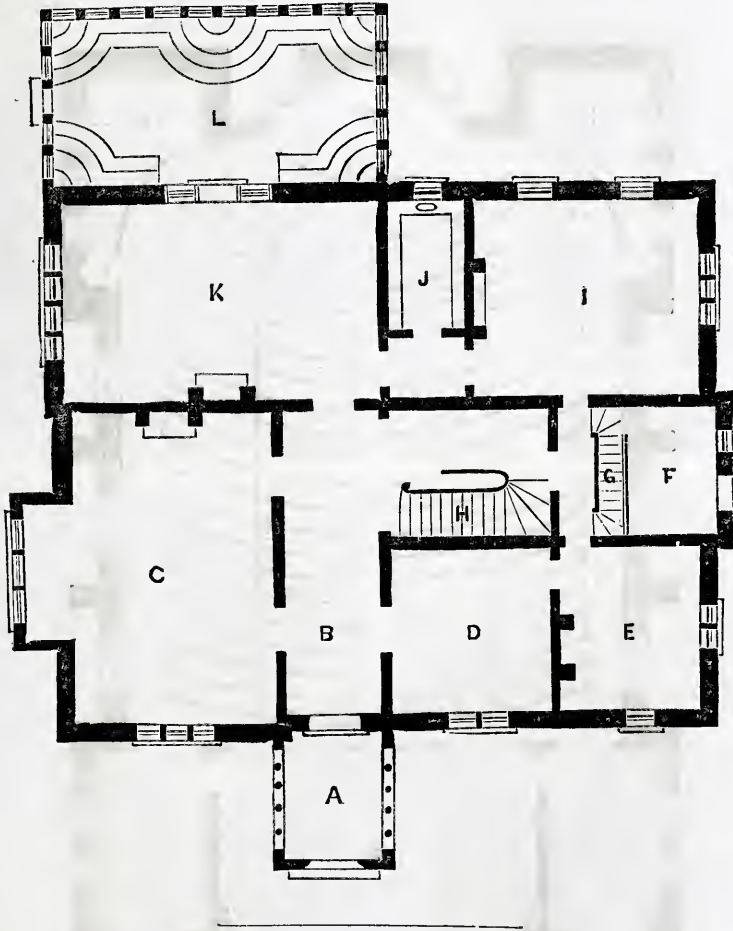
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Several paragraphs of handwritten text at the bottom of the page, also illegible due to fading. The text appears to be a detailed description or report related to the floor plan above.

with glass door leading out into the Conservatory L.

Few arrangements of plan can be more complete. Chimnies all in the inner walls retain the whole of the heating within the house in winter. And so thorough is the natural ventilation, by doors and windows, that coolness is secured in the summer time.

Executed in stone, either hammered or rough rubble, with cut-stone trimmings, this house would present a pleasing appearance. In pressed brick, with stone trimmings, though not so consonant to surrounds of shrubbery as in stone, it would yet be a neat object and tend much to the embellishment of the outskirts of a city or village.



DESIGNS FOR SMALL CHURCHES.

THERE is a great want of suitable designs calculated to meet the tastes and necessities of those communities whose funds are too limited to admit of anything approaching to architectural display. Our object, therefore, in presenting the two which illustrate our remarks, is to show the way to others to do likewise.

Churches of large dimension and assuming appearance call forth profes-

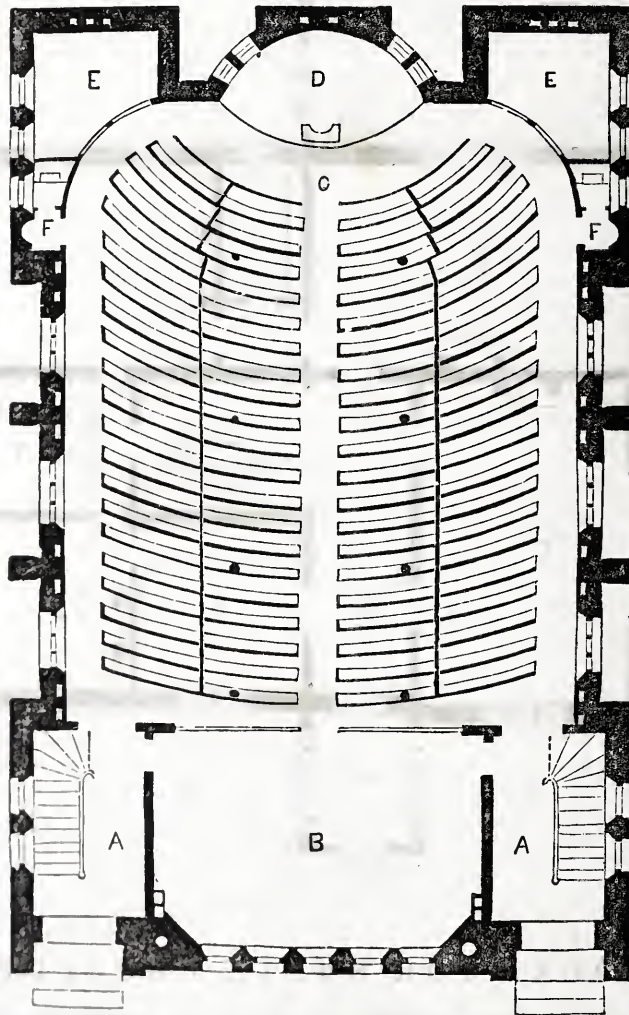
sional skill, because the expenditure will be commensurate with the expansive ideas of the wealthy for whose benefit such edifices are constructed. But a plainer class of erections, as much wanted, should draw out the efforts of our brethren, if only for the good they may do.

There are few architects who are not subject to the often occurring claims on their donative services in behalf of poor congregations, and, we say it with

pride, that we have yet to hear of the first instance of those claims not being promptly attended to by even the busiest of our brethren. Although it too frequently happens that their liberality is severely and most thoughtlessly taxed; for there generally is in every community some spirit too restless to cease troubling even those whose time

very limited. In a serial like the ARCHITECTURAL REVIEW there is an opportunity presented to give, from time to time, sketches and instructions, by which the wants of the bodies we allude to may be met. The pastor in the backwoods, and the minister on the prairie, as well as the servant of God who teaches the poor in our crowded cities,

FIG. 1.

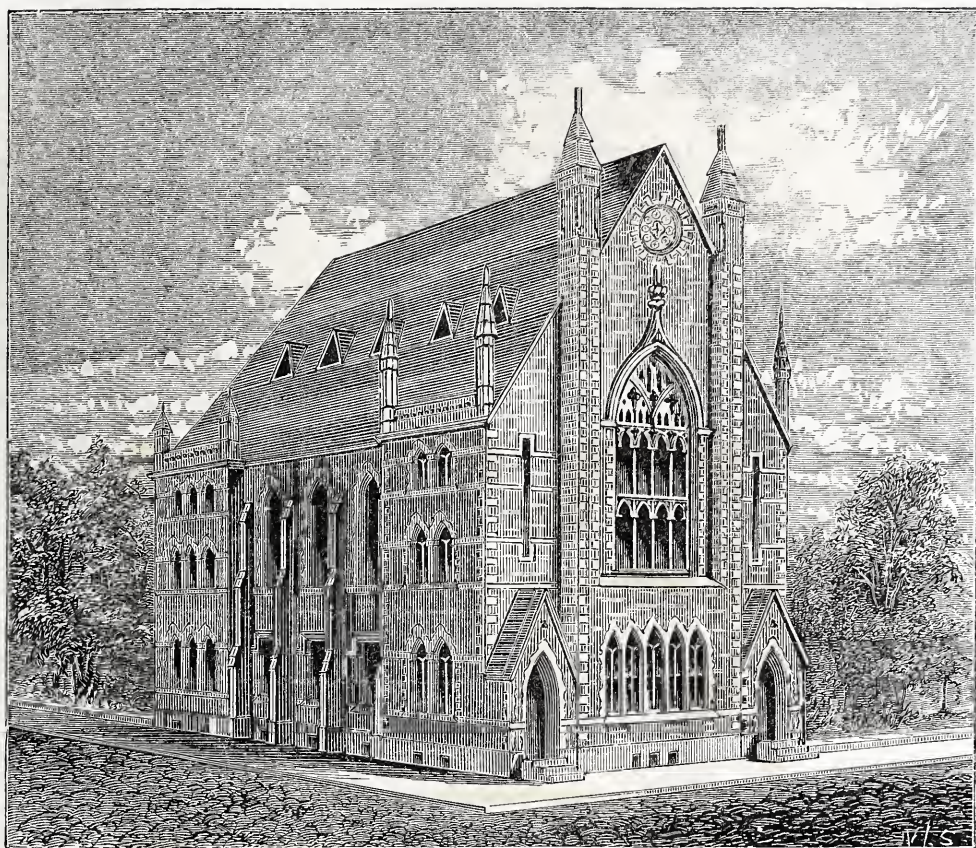


and skill are freely given, not to them personally, but to the sacred cause they are supposed to have an interest in. But let that pass.

The illustrated works on Ecclesiastical Architecture, which come from the press, usually treat of a class of edifices altogether beyond the reach of the congregations whose means are limited—

will each and all be benefitted by the information given, and a truly good work will thus be done. The two small churches here presented are now in course of construction in this city.

The one on the upper part of the page is a Chapel of Ease to the Calvary Presbyterian Church, now building on Locust street, west of Fifteenth street.



TWO DESIGNS FOR SMALL GOTHIC CHURCHES

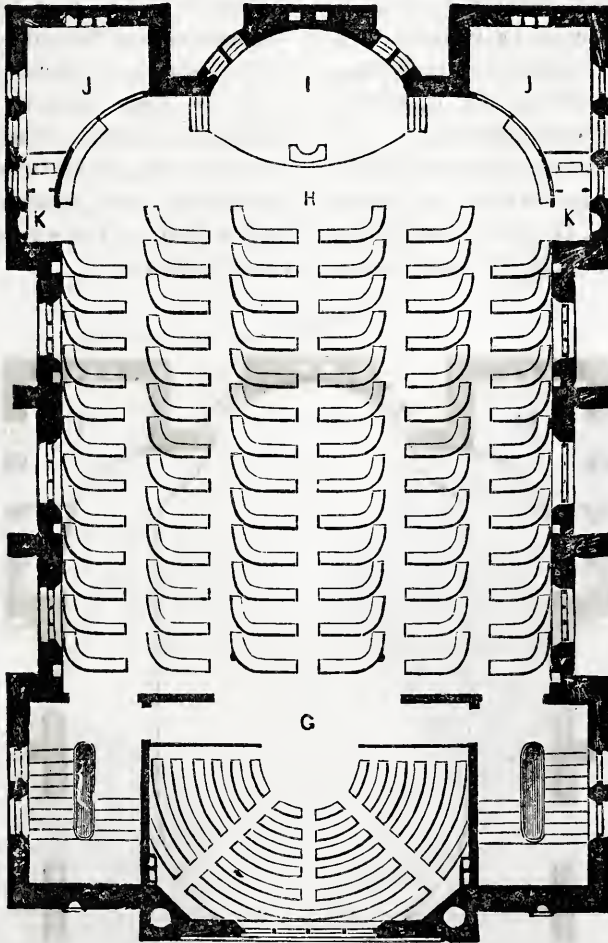
Its dimensions are fifty-seven feet front by ninety feet deep, outside measurement. It will be two stories high, with gallery.

The first story will be sixteen feet from floor to floor. This is to be the Lecture Room. The second story will be twenty-five feet at the walls, and thirty-nine feet to the apex of the ceiling in the

over the ladies' parlor there will be the Infant School.

On the gallery are three class rooms on the front, two of which are over the Infant School Room, and one over the eastern stairway. There are two class rooms in the rear. The walls will be of rubble masonry. As high as the level of the first floor, and projecting

FIG. 2.



centre. The Gallery will be six feet wide along the sides, circular on front, and the ends curved at the rear. Its floor will be level.

Besides the Lecture Room, the first floor will contain two class rooms and the ladies' parlor. Immediately over the Lecture Room, and of the same size, will be the Sunday-school Rooms. And

two inches, with a wash, the exterior will be hammer-dressed. Above that, the superstructure will be all laid broken range, pointed off, except the rear wall, which will be rubble with rock face. The whole will be faced with Trenton Brown Stone.

All the dressings of the doors, windows, buttress, caps, cornices, pinnacle

caps, etc., will be distinguished by a finer class of work.

The roof and its dormers will be covered with best Blue Mountain slate, of medium size, varied with green and red color.

The interior as well as exterior finish will be Gothic in style, inexpensive yet expressive.

FIG. 1. The plan of the Lecture Room is here shown: A, A, the entrances, with stairs in each, leading to School Rooms and continuing to Gallery. B, Ladies' Parlor. C, the Lecture Room. D, Platform and desk. E, E, Class-Rooms. F, F, Water-Closets.

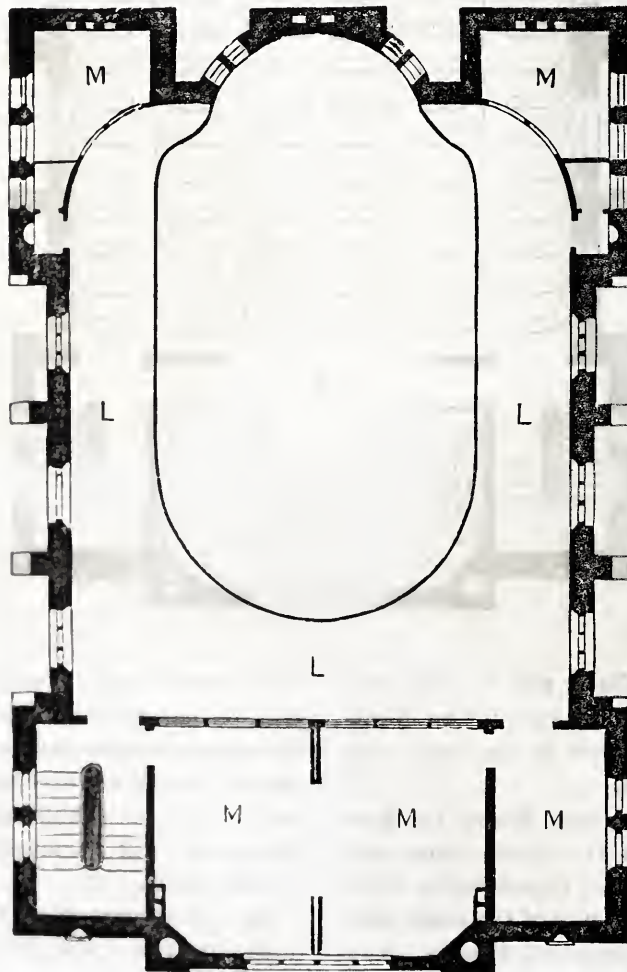
FIG. 2. This is the arrangement of the Second story, which contains: G, the Infant School Room. H, the School Room. J, J, Class Rooms. K, K, Water Closets.

Fig. 3. L, L, L, the Gallery. M, M, M, Class Rooms in front. M, M, Class Rooms in rear. It will be seen that, by means of sliding glass partitions, each floor can be considerably enlarged in accommodation. There are nine classrooms, and school room for over six hundred children. The galleries will hold two hundred and fifty.

The illustration below that of Calvary, is the design of the TRINITY REFORMED CHURCH, now being erected on the east side of Seventh street, south of Oxford street, in this city.

It is also Gothic in style, and although smaller than that just described, will, nevertheless, be a very convenient and tasteful church, and well suited to the wants of its growing congregation.

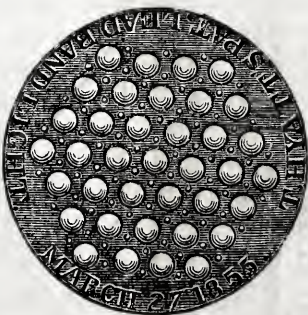
FIG. 3.



HYATT'S VAULT LIGHTS.

FEW patents have conferred a greater blessing on society than that of which the accompanying cut is an illustration. The misery which was closely akin to area gratings, as used in "our grandfather's day," may yet be remembered by some not very old readers. Then light had to be admitted from the sidewalk without trespassing on the right of way by encroachment, and the manner in which that object was attained was by the use, invariably, of open iron gratings, which, whilst they admitted the light in *bar sinister*, as our heraldic authorities would say, did not offer any opposition to the falling dirt of the street which resolved itself alternately into dust or mud, according to the relative condition of the weather. The very palpable consequence of such a state of things was, that all areas under sidewalks were an accumulative nuisance which had to be borne if day-light was desirable in underground places.

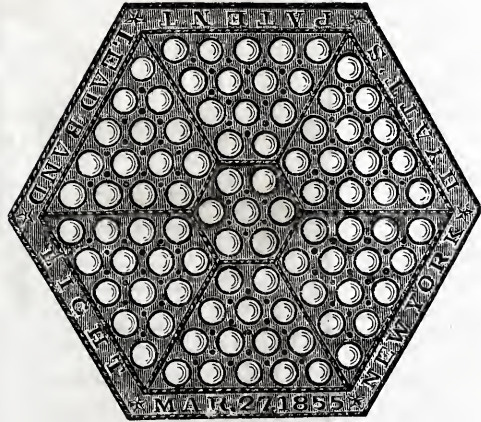
Let us pause for a moment to mentally look back on those days of dirt-clad cellar windows, if it were only to enhance the value to our mind of the present state of things.



Hyatt's Patent Vault, and Side-walk lights, are so well known and so universally appreciated North, South, East, and West, now-a-days, that it is doubtful whether we are enlightening a single reader of the *REVIEW* in thus alluding to them. But, unfortunately there are

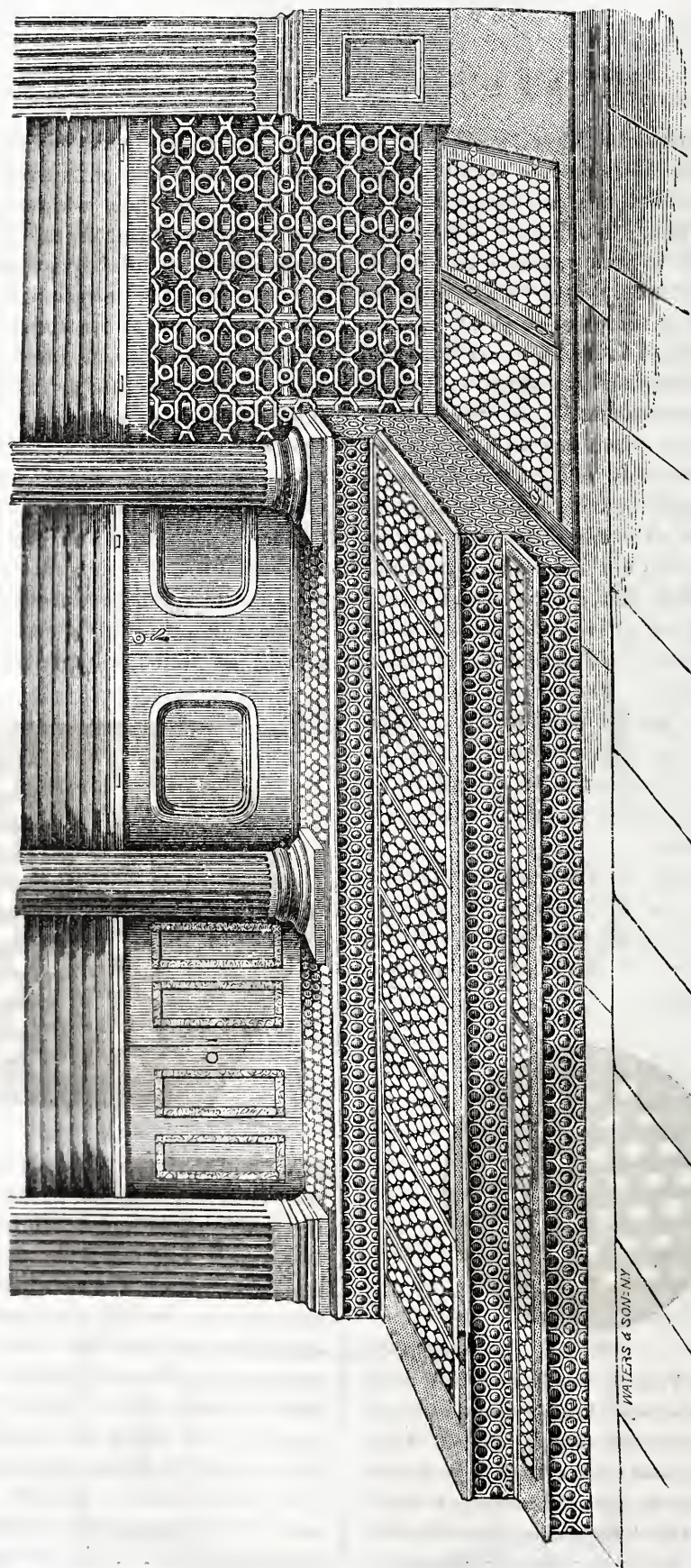
people so listlessly unobservant in this world of ours, as to walk over them, aye, and walk under them, without perceiving the benefit enjoyed from them. Such people look on all improvements without wonder or admiration, and calmly set them down as matters of course—things that were to be, improvements—the growth of necessity. The inventive mind that gave them birth is neither thanked nor thought of. But all men are not so stolid. Many will take an interest in the benefaction and the benefactor, and to such the present notice will recall a duty—the grateful acknowledgment of a benefit bestowed.

The sidewalk lights are powerfully strong as well as perfectly weather-



proof and they can be turned out in any required form in single plates to a maximum size of six and a half feet long by two and a half feet wide, or in continuous platforms. They are likewise made to answer an excellent purpose as steps and risers, or even as entire flights of stairs of any desired length. They are three quarter inch thick, hexagonal shaped glass, well secured and presenting a really handsome appearance.

In our preceding number we made some observations on a more fitting system of awnings than that now in use.



We think there can be very little doubt but this very invention could be well made available for such a purpose, and we sincerely hope that the hint will not be lost sight of.

BROWN BROTHERS of Chicago have for the last ten years been active in the manufacture and sale of the patent sidewalk lights, and there is scarcely a city of any pretensions in the Great West that has not awaked up to the use and value of this most beneficial invention,

and the pleasing consequence is that the Messrs. B. are now doing an immense business in the manufacture of them, at 226 and 228 Monroe street, Chicago, where the orders of our friends the Architects and Builders who propagate improvements in the growing cities of the irrepressible West, will be attended to, with that promptitude which has hitherto made the name of the firm of BROWN BROTHERS so well known, and their excellent manufacture so fully appreciated.

WHITE LEAD BY A NEW PROCESS.

THE manufacture of this important and useful pigment has been very successfully prosecuted within the past year, by a new process, the invention of Dr. H. Hannen of this city, and is destined to supersede the old method, both as regards economy in preparation and purity of material. The old or Dutch process, requiring some six to eight months for its completion, fit for painter's use; while by the Hannen patent it can be produced in from ten to fifteen days. The quality of the article is said to be fully equal, if not superior, to that of the lead made by the old method. The process of manufacture, as far as we can learn, is as follows:

The best Spanish pig lead is melted in a large iron kettle, holding from fifteen to eighteen hundred weight, and then drawn off by a suitable valve, and allowed to run over a cast-iron wheel or drum, about six inches on the face and three feet in diameter, running at a high speed, and kept cool by a stream of cold water constantly playing on it. The lead, in passing over this wheel, is cast into ribbons about the thickness of paper, it is then taken and placed on lattice shelving in rooms some eight to ten feet square, made almost airtight by a double thickness of boards, and capable of holding some three tons of

the metallic lead as it comes from the casting machine in ribbon form, the temperature of the room is then raised by injecting steam to about one hundred degrees, and then sprinkled several times a day with diluted acetic acid, converting it into sub-acetate or sugar of lead. While this operation is going on, carbonic acid gas is forced into the room by means of a blower or pump, which decomposes the acetate and forms a carbonate of lead; this operation of forming an acetate, and then a carbonate, requires from five to six days, until a complete corrosion of the lead is effected; the room is now allowed to cool and the lead to dry, after which it is taken out and sifted through fine wire sieves, which separates all undecomposed lead or other impurities. It is then ready for washing and drying. The finely powdered lead is mixed with water into a thick pasty form and ground in a mill of similar construction to an ordinary flour mill, from which it is allowed to run into large tubs filled with water, and thoroughly washed and allowed to settle. The last or finishing operation is to place it in large copper pans, heated by steam; when it is dried; from thence taken to the color grinder, where it is mixed in oil ready for the painter's use.

PAINTERS AND ARCHITECTS.

THERE is a presumptuous feeling in the breasts of those who, *par excellence*, assume the style and title of "Artists," both in the Old and the New World, which it would be well to look into were it not that valuable time might thus be wasted on an exceedingly contemptible subject. We allude to the arrogation of eminence by those autocrats of the easel, who, not content with the undue position conceded to them by the vain and the frivolous who stilt themselves on their recognition of "high art," and affect to govern the very laws of taste itself, go farther in the fulness of their ambition, and seek to ignore ARCHITECTURE as an art. This outrage on common sense is not confined to America, it has been continuously practised, if not boldly promulgated, for over a century in London, by an institution bearing the absurd title of THE ROYAL ACADEMY, originally intended to foster and advance the interests of Architecture, Painting, and Sculpture, yet in forty elections, or rather selections, of Associates, that is, of those ordained to emblazon their names with the R. A., *but four were Architects!*

And, notwithstanding the studious efforts made by our profession to elevate our position and draw at least our share of public attention, we find that this Royal Academy and the rest of the aristocratic Dmdrearifications, positively prohibit the appearance of architectural designs upon the walls of their National Galleries by crowding every available foot of wall space with easel-work, (we beg pardon—"paintings,") ephemeral, unnatural, mannerized exudations of the "modern school," that barely patronizes Nature as a stupid fact, which to be got round must be obliterated in gaudy coloring. But, shall Architects make bold to criticize these "Artists?" No, PAINTING is a sublime gift, by the magic

touch of which the coarse inelegant canvas is made to put forth emanations of the ethereal mind, which it were a pity to limit to the paltry boundary of a gilded frame!

What is ARCHITECTURE?

Where would the art of PAINTING find a shelter, were it not for Architecture?

Do the gentlemen of the brush and palette ever look around and above at the walls, the ceilings, or even at the tessalated floor of the rooms where their small framed efforts are on exhibition, and suffer their overweening vanity to acknowledge that ARCHITECTURE is really something?

How many painters can properly depict it? How many?

The ignorance which urges the pre-eminence of PAINTING at the expense of ARCHITECTURE is more to be pitied than contemned. And the public patronage lavished on the one and withheld from the other, is superinduced by the ease with which any one can assume to be a critical admirer of an art whose governing rules are imaginary rather than real or substantial.

Some see beauty in the fidelity which a painting bears to Nature. Others consider that very fidelity as slavish imitation. And a very general notion obtains amongst painters of "assisting Nature." Now, ARCHITECTURE stands upon the solid base of TRUTH. Without imitating, it borrows applicable ideas from Nature to be used in carrying out its designs. Nor is it merely the imaginations, limnings, as in the case of PAINTINGS; those designs have to be executed. CONSTRUCTION then comes in as the solid, tangible, work of art, which shall defy the elements and render ARCHITECTURE the protectress of PAINTING, without whose solid enduring defence the more fragile art would speedily decay and become unknown.

But, are not the professors and admirers of ARCHITECTURE themselves to blame for the degraded position it holds to-day as an art, here and in Europe? Why is there not more practical enthusiasm, and altogether less contemptible jealousy, and ill-natured feeling, amongst all who claim to have an interest in this the grandest and most overshadowing of the Arts?

If PAINTING must needs hold an exclusive position as regards the public exhibitions of what is most erroneously called the "Fine Arts," why cannot ARCHITECTURE and SCULPTURE assert their dignity, and give the public a chance to patronize them independently? The truth is that Architecture and Painting do not at all agree in sentiment; the one is a mere luxury, and no more; the other is a necessary art, adorned or unadorned. The one can be glanced at and instantly understood; the other demands the effort of the mind to study and to comprehend. In PAINTING, the eye is the arbiter; in ARCHITECTURE, the eye and the mind must form the judgment. It is not what a merely pretty picture is displayed; it is—how would that design look in execution?

Most of people who go to a "Fine Art Exhibition" are superficial observers. They glance at pictures by the hundred. Such are not the persons from whose judgment ARCHITECTURE can expect even a recognition. They have been bedazzled with the sheen of the gilded frames, and the well laid-on varnish which bedizens the bright pigments of the gaudy glare of Art, which they have just left, and are, of course, impatient of the more staid and methodical elevations or perspectives, now presented in a narrow crowded section to their view. They have not time nor inclination to pause and consider them. They cannot bear to lose the impressions made by the "sweet shaded alley," the "dancing streamlet," or the "green reflective lake," with that charming sky that looks so much more like heaven

than nature. No, it will not do to exhibit ARCHITECTURE and PAINTING together, and it is time to acknowledge this so often proven fact. The two must be distinct. Let Architects put forth their powers, and show the community what their Art really is, and what it is capable of. People will go expressly to view an exhibition of Architectural designs, combined with Sculpture, and take much pleasure in the visit, because their mind is prepared for the occasion, and will not be distracted by a rival exhibition of quite another effect. To say that the public generally will find no pleasure in the consideration of Architecture is to assert that which is disproved by fact. When the Commissioners, appointed to choose a fitting design for the new Post Office at New York, threw open to a limited number of visitors the inspection of the collection of designs, the rooms were crowded each day of the exhibition, and innumerable applications were made for tickets of admission. Had all the public been allowed the privilege, no doubt it would have been universally accepted. Yet that was but a very uninteresting display compared to one in which the subjects would be manifold, and the scales various. Not to speak of the freedom of display in color, which on the occasion adverted to was necessarily confined to an extreme limit.

Why cannot our Architects have an independent exhibition? There is nothing to be gained, but on the contrary every thing to be lost by clinging to the skirts of the *painters*. An effort in this direction could not fail to meet with the warmest support from our monied citizens, who are constantly proving substantially their regard for the progressive welfare of Architecture, by expending vast sums in buildings. And we have no doubt, but that State Legislatures would promptly and liberally aid any such effort to educate the general public in an art so intimately connected with the history of civilization.

HONOR TO WASHINGTON.

THE anniversary of this great nation's independence never was more fittingly honored than on the Fourth of July last, when, in this city, and in the front of the glorious old Independence Hall, Philadelphia inaugurated her statue of him who was FIRST IN PEACE, FIRST IN WAR AND FIRST IN THE HEARTS OF HIS COUNTRYMEN. There is not in the United States a single spot more sacred to the cause of Freedom than that on which stands Independence Hall, where our great fathers of the Revolution so nobly pledged to the cause of mankind their lives, their fortunes, and their sacred honor, and where the truly noble Washington was heard and seen, when the hopes of an embryo nation rested on his integrity.

Although the thought well suggests itself that an honor such as that just now paid the great patriot's memory should long ere this have been credited to Philadelphia, yet it is never too late to do our name justice before the world; and it is appropriate that the rising generation of a closing century should thus mark the establishment of a free government for which he fought and conquered.

Thanks to the school children whose contributions thus have given to Philadelphia, what their sires so long neglected, a testimonial worthy of our grateful recollection of the foremost of Americans.

On the 13th of December, 1867, a contract was made with our eminent citizen artist, Mr. J. A. BAILEY, and on the 2d of July, 1869, the material for the granite base was delivered on the ground. The following day the statue was duly erected, where it now stands in front of the entrance of that venerated Hall.

In the centre of the foundation is placed a box containing the names of children and teachers, Directors and Board of Controllers, Mayor and City Councils, heads of departments, records

of the Association, etc., and a copy of the Holy Bible. The base of the statue is of Virginia granite, from the Richmond quarries, and is in four pieces, weighing about twenty tons. The statue is of white marble, 8 feet 6 inches high. The left hand of Washington rests on the hilt of his sword, sheathed in peace; his right hand rests on the Bible, the Bible on the Constitution and American flag which drapes the supporting column on the right of the figure. The weight of the figure is about six tons. The whole height of base and statue is 18 feet 6 inches. On the north front the base will bear the name—WASHINGTON; on the south, this inscription:

ERECTED

BY THE

WASHINGTON MONUMENT ASSOCIATION

OF THE

FIRST SCHOOL DISTRICT OF PENNSYLVANIA.

The total cost, including a railing, will be about \$6,500.

The ceremony of the unveiling was a most impressive one, the children being in the act of singing "Hail, Columbia," when, at a given signal, the flag covering the noble statue was raised, and from its folds came forth innumerable small flags which flew among the people and were eagerly caught.

As the marble image of Washington came into view the cheers of the assembled thousands were only outvied by the cannon in the square, and the national hymn was for the time drowned in the enthusiasm of the event.

The President of the Washington Monument Association Mr. GEORGE F. GORDON, in an appropriate address to the Mayor and Select and Common Councils, presented the beautiful monument to the city. It was received by the Mayor, Hon. DANIEL M. FOX, in a suitable reply, and the benediction being

pronounced, this most interesting event became part of the brightest of Philadelphia's chronicles.

THE munificence of our fellow-townsmen, W. W. Corcoran, Esq., has been

handsomely acknowledged by the National Academy of Design, at New York, which has transmitted to him congratulatory resolutions with reference to his recent foundation of a gallery of art in this city.—*Washington Chronicle*.

NEW SOUTH WALES.

OUR latest files are to April 21st, inclusive. Sydney was at that time in high spirits over the recent visit of the Prince Captain of H. M. S. *Galatea*. The most noteworthy action of whom was the laying of the cornerstone of the testimonial to the hardy navigator and discoverer, Captain Cook. We extract the remarks of the leading journal of Sydney.

"THE CAPTAIN COOK MEMORIAL.—A monument to the memory of Captain Cook will be rather an expression of our admiration for his character and services than an enhancement of his fame. The last generation was filled with wonder at the narrative of his discoveries. The first quartos that record them display in most striking forms the scenes and objects he made known to the world. He visited many islands of the Southern seas, whose voluptuous and animated social life attracted as to a new-found Paradise. Subsequent experience scattered the illusions of fancy, but brought out more clearly the value of his labors. New South Wales presented to his view a land of savages, lowest in the scale of civilization, but it also offered a noble field for British colonization, perhaps less appreciated while America was still a dependency of England, but brought into notice a few years after that country ceased to belong to the Crown.

"Cook first landed at Botany Bay, on the 19th of April, and on the 23d of August, he took possession of the entire country in the name of the SOVEREIGN of England. The precise spot where he anchored is marked in the charts by a nautical symbol, and can thus be identified. On reaching the shore he found a spring of water ample for the wants of the ship, and tradition has reported

that he bent his knees in adoration of the Supreme Being.

"The character of Cook as a navigator occupies the first rank in nautical sciences. It is to his high honor, that modern times, though they have added to his discoveries, have been rarely able to dispute them. Nothing is superfluous—nothing is obscure. The modern investigator starts from the observations made by Cook as undoubted facts. Every year displays more strikingly, not only the results of his discoveries and their value, but the almost prophetic foresight which presided over them.

"The history of Captain Cook is an example of the lofty position which may be taken by the humblest ranks when attended with high intelligence and superior moral qualities. The first step of his naval career was as a cabin boy. He rose to the command of an expedition which was suggested by scientific men, and their warmest hopes were more than fulfilled. They had seen with regret the blanks in the map of the world, and the ignorance which prevailed in reference to the true character and capabilities of countries partially known. The men of science who accompanied him on his voyage acquired for a time a scarcely inferior fame. Mr. BANKS and Dr. SOLANDER are names familiar to the readers of Cook's Voyages, but the magnificence of his achievements leaves in the shade every inferior merit. He stands forth as the founder of a new era in nautical discovery, and as the revealer of a new world.

"Could Captain Cook have seen the spot on which it is proposed to erect his monument, and from thence, with superhuman knowledge, anticipated the events of this day, he would have been overwhelmed with awe.

"EDMUND BURKE delineated, while the struggle with America was still

transpiring, the emotions of astonishment with which he supposes Lord BARNURST, then an aged statesman, might in the days of his youth have looked forward, under the guidance of some celestial instructor, to the events which had raised American colonization from insignificance to greatness. But what emotions would have stirred the heart of COOK, if, standing on this spot, he had foreseen the progress of colonization, the painful labors included in the first fifty years, and the immense prosperity of the last.

"Had such heavenly anointing enabled him to foresee all this, his grateful spirit would have been filled—with—what sacred joy! Still further extending his intellectual prospect, he might have foreseen the arrival of a vessel furnished with the results of science then unattained, advancing like some being, instinct with intelligence, from port to port, through billows over which he was tossed, and independent of winds for which he had to wait, arrived at a fixed hour at the haven of its destination. And still further, he might have seen the great grandson of that monarch whose name he proclaimed as the lord of this territory—the son of a royal woman who has inherited all the virtues of her race, without its faults; and he might have seen that son, surrounded with a multitude of her subjects, standing over the first stone of an edifice to do honor to his memory."—*Sydney Morning Herald*, March 27.

"THE NEW POST OFFICE, SYDNEY.—The keystone of the central arch of the new Post Office, George street, was laid by His Royal Highness the Duke of Edinburgh, on the 1st instant, in the presence of a vast concourse of spectators. A large platform was erected behind the arch, and on a level with the stone, access to which was obtained by carpeted stairs, springing from the northern side of the building.

"The stone laid by the Prince forms the keystone, archivolt and two spandrels of the central archway of the George street front. Upon the face are to be carved the Royal arms, and upon the coffered soffits the arms of the Duke. The dimensions of the stone are:—Length 13 feet 6 inches, width 4 feet 6 inches, and height 6 feet 6 inches—the whole being equal to 394 cubic feet. The weight is twenty-six tons. This stone is doubtless the largest yet laid by his

Royal Highness, and it is probably the largest block of sandstone he will ever lay, for it would be difficult, if not indeed impossible, to get *sound* blocks of sandstone of equal size from any quarry in England, or elsewhere. Few cities are so favorably situated for sandstone as Sydney, for in almost every direction blocks of this description of freestone may be obtained of almost unlimited dimensions, and without a flaw. The most casual observer of the new Post Office cannot fail to notice the massiveness of the stones used in the building, and the solidity of the structure is unequalled by any other erection in the city. The contractor has placed very powerful cranes in his quarries at Pyrmont, whence these immense blocks of stone are obtained, and great credit is due to Mr. C. Saunders for the workmanlike manner in which these blocks—far exceeding in size anything previously attempted in the colony—have been quarried. The difficulty of removing these heavy blocks of stone must be very considerable; and the stone laid by the Duke of Edinburgh was equal to the force of twenty-one horses, calculating a horse to draw about twenty-five cwt. Ordinary wagons or trucks usually carry weight not exceeding 5, or, at most, 6 tons; and as there are in this building many blocks of granite and freestone of 10 to 20 tons, the difficulty of carriage can easily be seen. In hoisting and fixing these large stones 'travellers' are used, which can move longitudinally and crossways; and as the lift is directly over the stone to be fixed, there is less liability of accident than by the use of cranes or other contrivances.

"The building progresses as rapidly as the elaborate nature of such work will admit. It is now to the height of the first story, twenty-five feet from the floor line, which is three feet above the causeway in George street. The works are being carried on under the superintendence of the Colonial Architect, Mr. James Barnet. The contractor has fixed all the polished granite columns on the work front facing the street, which is to be taken through from George street to Pitt street. They are exceedingly beautiful, and are resplendent with a lustre brighter than that of marble. The polish has been brought out by an elaborate process, and is, we believe, ineffaceable by atmospheric influences. Each column is polished by machinery—

incessant friction continued for a fortnight being requisite to bring out the lustre. There are to be twenty-seven columns in the George street front, which the Government have also decided shall be of polished granite, material which for beauty and durability cannot be surpassed even in Europe. The building, when completed, will compare favorably with any structure erected for a similar purpose elsewhere.

"The blue granite used in the edifice is obtained by Mr. Young from his quarries at Moruya, about one hundred and sixty miles to the south of Sydney. The quarries are opened in the side of

the hill—a mountain of granite in fact—and about half a mile of railway constructed across the swamp carries it to a granite jetty, which has been built in the river, into water deep enough to admit of vessels drawing fifteen feet of water loading alongside. The granite is sound—sufficiently so, indeed, to admit of two hundred feet lengths being quarried. A block has been got out for the front columns of the Post Office, which weighs nearly three hundred tons, and the dimensions of which are:—Length, 22 feet; breadth, 22 feet; thickness, 8 feet; total contents being 3,520 feet."

BUILDING IN CONCRETE.

IT is something to be wondered at, the slowness with which the advantages of concrete, as a building material, have been developed and accepted by practical men. As a foundation it is beyond all doubt the firmest, simplest, and most economical. But, its merit is not confined to underground operations; for, as has been repeatedly maintained during the last twenty years, it is capable of making walls of unsurpassing strength and durability, giving comforts which no other material will. It is true that certain parties have sought to astonish the world with securely patented *inventions*, by which Nature's humble efforts at making granite were at once surpassed, and the old foggy way of the consolidation, by the tedious action of time, of grains of mica, quartz, and feldspar, set aside by the use of this invaluable mode of making as good an article with one man power at a rate fully equal to supplying the demands of all who want stone houses erected rapidly from the raw material!

All this is arrant folly, and should not be listened to, much less patronized. The making or undertaking to make stone in blocks is a step, aye, a long stride backwards.

The object of cementing together

blocks, whether of brick or stone, is simply to produce one solid mass. And it is because we cannot conveniently carve out in a *monolith* or mass together in one *tumulus* the desired dwelling or temple, that we are forced either to break blocks of stone into fragments, or mould and burn earth into bricks. Now the idea of forming artificial stone into blocks still leaves the expensive necessity for cementing them together; and therefore instead of improving our condition, actually leaves us worse off, by giving us, as a substitute for Nature's well-tested material, a most unreliable article, which has already too clearly proved its utter worthlessness. However, this should not cause the friends of progress to give up all idea of simplifying and economizing the mode of wall structure. On the contrary it should stimulate them to make that exertion in the right way, which has hitherto been so persistently and blindly made in the wrong.

In Europe they are taking this subject into serious consideration. In England, under the name of CONCRETE; in France, under the title of BÉTON. In the latter country, much has been done lately, and all arising out of the excellent work on cements given to the

world by M. VICAT, whose name should be enshrined forever in the Temple of Fame, for the amount of good, present and prospective, which his earnest labors have done the Art of Building.

One of the most indefatigable and successful of experimenters in *béton* is M. COIQUÉ, who has proved beyond all cavil the excellence of that composition when applied to the sustaining of weight or resistance of pressure.

In London we find Messrs. Drake, Brothers and Reed, under Her Majesty's Letters-Patent, undertakers of Building in Concrete.

It is the machinery they use that is patented, we believe, and not the material; for there are many others in this branch of business. Mr. JOSEPH TALL, of London, has also a patent for a peculiar method of building in concrete, and has executed some contracts in Paris, where, in 1867, he took a prize at the Exposition.

It is evident, then, that concrete is forcing its way, and that it is not an unworthy subject for the inventive minds of our astute countrymen.

What we particularly need in order to give an impetus to construction in concrete is a well-systematized apparatus, movable and always available, and that men should be drilled to work to the greatest possible advantage; for it is the want of these requisites that makes concrete to-day a material so little known and so seldom used.

Let an active company, with sufficient capital, start the business in any of our large cities, and concrete will soon assert its excellence as a building material, and an investment will be secured, giving profit to its holders and satisfaction to a very large section of our population, to whom economy must prove the key to comfortable independence.

The quarry companies in Connecticut were never doing a heavier business than this season. Three quarries now employ over one thousand laborers, seventy-five horses and one hundred yoke of cattle.

A REMARKABLE CENTENARY.

How few there are who pause for one instant from their plodding after the deified "Dollar," to reflect that this present year, 1869, is the most remarkably commemorative of any yet on the Book of Time.

It is now one hundred years since HUMBOLDT, CUVIER, the first BRUNELL, JAMES WATT, Jr., and Sir THOMAS LAWRENCE, among the most eminent of the world's civilians—and NAPOLEON the First, WELLINGTON, SOULT and NEY, among the most advanced rank of mighty military chiefs, had birth.

It is one hundred years since the elder WATT's condensing steam engine was invented, and that invention which brought poverty with its production has, in these hundred years, revolutionized the globe, and made not alone individuals, but whole nations wealthy and powerful.

No nation on the globe owes more to WATT's steam engine than does this of ours. Where now would Civilization be coiled up? Where now would Science be secluded comparatively unnoticed and unknown—were it not for that one invention?

The peoples of the world have been growing and multiplying, and where would have been the room, or the employment for the teeming millions, were it not for that happy thought which in 1769 became a palpable fact?

A wise Providence was over all, and the brain that worked out the idea of the condensing steam engine was but doing its special part in the great work of civilization and progress.

This Centenary is one which should not be allowed to pass unheeded, especially now that we have just drawn the extremes of the earth nearer, not alone to the ear, but to the eye itself.

"How fast they build houses now!" said H.; "they began that building last week, and now they are putting in the lights." "Yes," answered his friend, "and next week they will put in the liver."

AUTOMATIC WATER ENGINE.

An important discovery connected with the raising of water is claimed to have been made by Dr. Bouron, a physician of some reputation, residing at Heverville, Seine Inferieure. It appears that by a very simple piece of mechanism he can raise a continuous stream of water to almost any altitude, without labor of any kind, and without expense, beyond that necessary for the first cost of the machine, and this is by no means large, considering the amount of useful work which it yields. Dr. Bouron states that the power of the machine is based upon a natural and immutable mechanical principle, and that by it there may be created a continuous current of water at the surface of the soil, wherever there exists, no matter at what depth it may be, a spring of water. The machine is intended to supersede all existing pumps, its construction not being more expensive, whilst it has the additional advantage that no expense is incurred for keeping it constantly and usefully at work, although other pumps, especially when the water is raised a great height, necessitates enormous expenses compared with the useful effect produced, and that, too, during the whole time they are at work. It must not be forgotten, however, that it is a stream and not a jet of water which the new machine produces, so that, although it would be well adapted to supply water to fire engines, for example, it could not replace them. It is claimed that the machine will yield the same quantity of water as that being produced by the spring to which it is adapted, (less, of course, the loss inseparable from the working of all mechanical apparatus), and at any height, whether it be one thousand metres, two thousand metres, or more. Dr. Bouron also observes that, however paradoxical it may appear, he has found "the greater the height to which the water has to be raised the greater is the power of the machine."

But the relative proportion of the power to the speed is quite in conformity with the principles of mechanics. The greater the height to which the water has to be raised, the greater the power and the speed that can be brought to bear upon it; but the greater the horizontal section of the column of water to be lifted, the more will the speed diminish.

REMARKABLE MASONIC INCIDENT.

The first masonic funeral that ever occurred in California took place in the year 1849, and was performed over the body of a brother found drowned in the Bay of San Francisco. An account of the ceremonies states that on the body of the deceased was found a silver mark of a Mason, upon which were engraved the initials of his name. A little further investigation revealed to the beholder the most singular exhibition of Masonic emblems that was ever drawn by the ingenuity of man upon the human skin. There is nothing in the history or traditions of Freemasonry equal to it. Beautifully dotted on his left arm in red or blue ink, which time could not efface, appeared all the emblems of the entered apprentice. There were the Holy Bible, the square and the compass, the 24-inch gauge and the common gavel. There were also the mosaic pavement representing the ground floor of King Solomon's Temple, the intended tessle which surrounds it and the blazing star in the centre. On his right arm, and artistically executed in the same indelible liquid, were the emblems pertaining to the fellow craft degree, viz.: the square, the level, and the plumb. There were also the five columns representing the five orders of architecture—the Tuscan, Doric, Ionic, Corinthian, Composite.

In removing the garments from his body, the Trowel presented itself, with all the other tools of operative Masonry. Over his heart was the Pot of Incense. On the other parts of his body were the

Bee Hive, the Book of Constitutions, guarded by the Tyler's Sword, the sword pointing to a naked heart; the All-seeing eye; the Anchor and Ark, the Hour Glass, the Scythe, the forty-seventh problem of Euclid; the Sun, Moon, Stars, and Comets; the three steps emblematical of Youth, Manhood, and Age. Admirably executed was the weeping Virgin, reclining on a broken column, upon which lay the Book of Constitutions. In her left hand she held the Pot of Incense, the Masonic emblem of a pure heart, and in her uplifted hand a Sprig of Acacia, the emblem of the immortality of the soul. Immediately beneath her stood winged Time, with his scythe by his side, which cuts the brittle thread of life, and the Hour Glass at his feet which is ever reminding us that our lives are withering away. The withered and attenuated fingers of the Destroyer were placed amid the long and gracefully flowing ringlets of the disconsolate mourner. Thus were the striking emblems of mortality and immortality beautifully blended in one pictorial representation. It was a spectacle such as Masons never saw before, and, in all probability, such as the fraternity will never witness again. The brother's name was never known.

NECESSITY FOR PURE AIR.

Those of our citizens who were "to the manor born," and never left their native land, cannot form any idea of the comfort they enjoy as compared with the misery endured from birth to death by thousands of kindred humanity in the other parts of the world. Even in highly cultivated and brilliant England and her dependencies, we find enough to shock the feelings and make us ask ourselves "can such things be?"

In a pamphlet recently given to the world, DR. MORGAN, a Master of Arts, and a prominent member of the British Medical Association, repeats in print a paper which he read before that learned

body at Oxford, in August last; and but for which publication we would have been in ignorance of the actual depth of misery to which so many good and faithful subjects of that proud and wealthy monarchy are condemned uncared for and unthought of.

"The author remarks that the housing of the poor, while beset with great difficulties, is most intimately connected with the future prosperity of the great mass of the people. In all our great cities, there are unhealthy quarters, where the death rate is exceptionally high, and the reason of this, after careful inspection of many such places, Dr. Morgan believes is to be found in this statement. Bad air, or too little of it, kills the people.

"Men will grow robust and vigorous, the author remarks, on very poor food, in very dirty cabins, and in very sorry attire, provided they enjoy a pure and bracing atmosphere, and the great physical development of the nations of the Hebrides and the western highlands of Scotland is cited as an example. In striking contrast to this, we find that in the Isle of St. Kilda, a small island, numbering about eighty inhabitants, three out of every five infants born alive are carried off a few days after birth by a convulsive affection allied to tetanus, the difference being apparently due to the huts having no smoke-hole in the thatch, and being rendered impervious to air by double walls filled in with peat and sods, the object of which is to prevent the escape of smoke, and in due time the soot is collected and used as manure."

DRINKING FOUNTAINS—This philanthropic movement which offers the grateful cup of Nature's refreshing beverage to the parched lip of the passenger, is one that takes a high place indeed in the church universal, at whose shrine all bend in unison, and know no discordant thought, but love one another for the love of God.

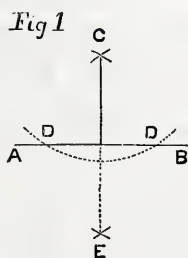
LESSONS FOR LEARNERS.

PRACTICAL GEOMETRY.

WE will not commence our instructions with the hackneyed "definitions," but give our readers full credit for the knowledge of what is a *point*, a *right or straight line*, a *curved line*, *parallel lines*—and so forth, and proceed at once to practice.

There are some persons who think that with a drawing-board and square, they can, without fail, make all sorts of horizontal, perpendicular, or parallel lines, and that therefore any geometrical rules for such purpose are to them unnecessary. But, suppose the drawing-board, or the square is absent, or that neither can be had. In such an emergency the want of the following items of knowledge would be severely felt, and, therefore, the acquirement and retention of them is something desirable, and even highly necessary.

PROBLEM I. *To erect a perpendicular on a given right line.*

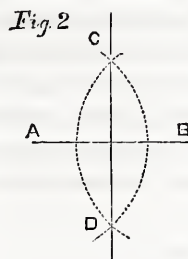


A, B, is the given right line. From the point C, with a radius longer than the perpendicular distance describe the arc, or part of a circle, D, D. And from the points of intersection with the right line A, B, describe arcs cutting each other at C and E. Join C and E, and the perpendicular is obtained on either side of the right line A, B.

PROBLEM II. *To erect a perpendicular at the middle of a right line.*

From the extreme points of the right line A, B, with radii less than the

length of the line describe two arcs intersecting each other at C and D, and

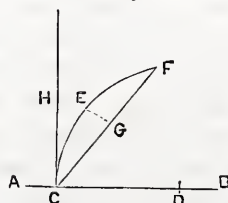


through the points of their intersection draw the line, which will be perpendicular to the given right line at the middle.

In this way, too, may any line be divided into too equal parts with facility and exactness.

PROBLEM III. *To erect a perpendicular at or near the end of a given right line.*

Fig. 3



Take any point, D, on the given right line A, B, as a centre, and to the required point C, as a radius, and describe an arc C, E, F. Take a portion of this arc, say E, and make from C, E, equal to E, F. Join F and C. Now with E, C, for a radius, describe the arc G, E, H, and make from E to H equal to from E to G. Then through H from C draw the perpendicular required.

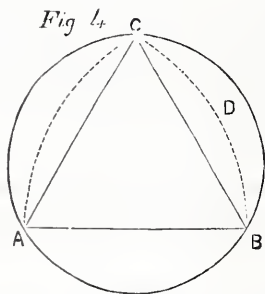
There are other methods of accomplishing this, but we will not introduce them here, as the one now given is sufficient.

We will now proceed to the formation of geometrical figures which enclose space.

That which is bounded by one line is called a *circle*; and a right line dividing

it into two equal parts is called its *diameter*; from the centre of which to either end is called the *radius*: and the boundary line is termed the *circumference* from the Latin words *circum*, around, and *fero* to carry. That is: a line carried around. Thus we see an area or space is enclosed by one line. An area may be enclosed by two lines; but one, or both of them, must be curved; as two right lines cannot enclose a space. But three can; and the figure is called a *triangle*.

PROBLEM IV. *In a given circle to construct a Triangle.*



Take the radius of the circle, and with it mark off six points on the circumference. Take two of these lengths of the radius and join their extreme points A and B, which will be the base. Now take this base as a radius and describe alternately two arcs cutting each other at C. Join A, C, and B, C, and a triangle is formed, whose sides being equal is termed an *equilateral triangle*.

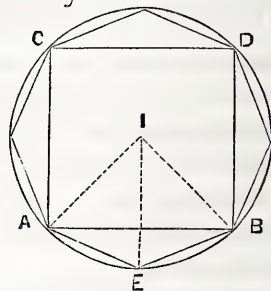
In order to ensure its being upright, erect a perpendicular at the centre, and let the two sides A, C, and B, C, meet that perpendicular where it intersects the circumferences. Or, begin the triangle at this point, and mark off two lengths of the radius, joining the extreme points as before; and do this at each side of the perpendicular; finally connecting the distant extremities of the two sides for a base.

PROBLEM V. *To construct an upright square in a given circle.*

Let fall a perpendicular, I, E, from the centre to the circumference, and

with that as a radius and E as a centre, cut the circumference at A, B, C, and D,

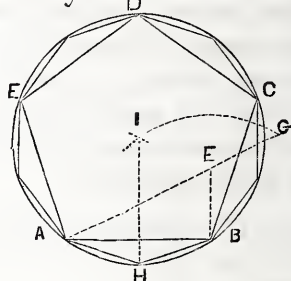
Fig 5



and join the points. The four-sided figure called a square is thus formed.

PROBLEM VI. *On a given right line, A, B, to construct a pentagon, or five-sided figure.*

Fig 6



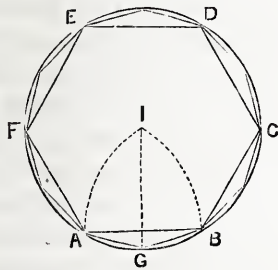
Draw B, F, perpendicular and equal to the half of A, B. Produce A, F, to G, making F, G, equal to F, B. From the points A and B, with the radius B, G, describe arcs cutting each other at I. From I, with the radius I, B, describe a circle. Inscribe the successive chords A, E; E, D; D, C; C, B, which with the base A, B, completes the pentagon.

If the circle be given, and a pentagon to be inscribed in it, the following is as simple as it is practical. From the centre erect a perpendicular, which shall meet the circumference at D. At each side of this point divide the circumference into five equal parts, and connect every two of them from D to E, from E A, and from D to C, C to B. Now connect A and B and the pentagon is formed.

PROBLEM VII. *On a given line A, B, to construct a hexagon, or six-sided figure.*

Take the length of the radius I, G, and lay it off from F to A, A to B, B to C, C to D, D to E, and E to F.

Fig 7



PROBLEM VIII. *To form an octagon, or eight-sided figure.*

Refer back to Fig. 5. Draw the radius I, E, till it meets the circumference at E. Join the points E, A, and E, B. Repeat this at each of the four sides, and the octagon is formed.

PROBLEM IX. *To form a decagon, or ten-sided figure.*

Refer to Fig. 6, and proceed as in the preceding problem.

PROBLEM X. *To construct a duo-decagon, or twelve-sided figure.*

Refer to Fig. 7, and duplicate the chords, as already shown.

We do not present 7, 9, or 11 sided figures, because they seldom or ever come into practice. Our object being to give what is useful and not overburden the memory unnecessarily.

The learner should go over and work out each of the foregoing problems several times. In fact, until they are soundly secured in his memory, so that on any emergency he can apply them to a required practice. They are the simplest rudiments, but as practically useful as they are simple. The Architect, the builder, as well as the several trades of carpenter, joiner, carver, stone-cutter, mason, and in fact, all in any way concerned in the practice of construction will at some time or other wish to recall one of these useful problems. Therefore do we dwell on the necessity

for committing them, understandingly, to memory, and likewise the advantage required in being able to draw them neatly and perfectly on paper. In order to do this with satisfaction to one's self, it is desirable that a fine point be constantly maintained on the pencil, and that uniform nicety be preserved with the curved lines, as well as the right or straight lines. For nothing looks worse than undue thickness in the one or the other. All should be alike.

In theoretical geometry a line, whether right or curved, is but imaginary, not having any thickness whatever, and therefore no palpable existence. In practical geometry the line must be visible, but ought to be so uniformly fine as to occupy scarcely any perceptible thickness. And herein lies the greatest beauty in geometrical draughting. By strict attention to this apparently trifling matter, its advantages will show wherever minute angles occur. They will be clear and distinct, and always satisfactory.

The learner should keep his first attempts, however coarse, for they will by comparison hereafter, show the advance he has made. Nor should he be content to "let well enough alone." There is no "well enough" in drawing. It is a progressive science, and the true artist never believes he has done his best. Go as near to perfection as you can, and do not turn aside from, or step over obstacles to reach the end you have in view. Whatever you have neglected in early study will surely haunt you through after years, and trouble you when you can least bear the annoyance.

We now conclude this primary lesson, hoping that our learners may profit by the hints we have thrown out, and will thoroughly prepare themselves for the advance in our next.

THE first brick house in Iowa was built by Judge Rerer, of Burlington, in 1839.

VINES FOR THE DECORATION OF COTTAGES.

THE GROUND NUT VINE.

A TOURIST riding a few miles in almost any New England city, would hardly fail to notice that a large number of the rural residences display a profusion of architectural embellishment, without wearing a cheerful, home-like look. He would pass cottage after cottage ornamented with slender porticoes, fanciful verandas, sculptured gables and deep bay windows, but situated in a pen-like looking enclosure, and surrounded with fixtures, dark and dismal; and with arbor vitæ hedges whose yellow cast clearly indicated that they had been planted in ungenial soil. In each narrow yard he would notice flower beds, containing many unhealthy looking plants, and most of these beds would exhibit the same arrangement and the same multifarious specimens of the odds and ends of Nature for miles. He would remark concerning these suburban seats that they were *pretty*; he would hardly say beautiful, certainly not charming. They were not satisfying to the eye—they were designed to impart an expression of exquisite rurality but failed. As the same tourist passed by some old-fashioned farm house, with its broad green lawns in front, shaded with green old elms; as he noticed the wood colored porch covered with luxuriant woodbine, the dovecote with its glittering birds, the dark orchards beyond the yard, the pond in the meadow overhung with willows; or, as he descried some inexpensive cottage, removed from the road and half hidden from view by graceful arbors and vigorous native trees, he would ride slowly and express his satisfaction at each of these scenes of rural taste and beauty.

It is not the richness of art that gives to English cottages their picturesqueness and poetic expression, but the

beauty of the grounds that surround them, and the vines that adorn them. It is not the fantastic gables, nor the latticed windows that so captivate the eye of the traveller, but the tasteful foliage that drapes them, and the lustrous vines that embower them. Denude these cottages of these embellishments, and many of them would appear as uninviting to the eye as the mouldering tower without the classic ivy.

Louis XIV had his Versailles, and his elegant queen her embowered Triannon; but the simple charms of Triannon proved more inviting to the cultivated minds of the court, than the gorgeous pile and artificial gardens at Versailles.

We devote too much time to the cultivation of exotics, and too lightly value the vines and shrubs of our native soil. Again, we sacrifice rich foliage that lasts for a season, to gaudy flowers that last only for a brief period. The double prairie rose is a very delightful sight—for a single week—and during the remaining season it is a miserable brier, commonly wormy and lousy. Yet the prairie rose is in common use as an ornament for the veranda, while the jessamine the woodbine, the wistaria and the luxuriant honeysuckle are, put in less conspicuous places, or their cultivation wholly neglected.

It may be cited as an evidence of improving taste in the rural art, that rustic work, which imparts to a place an expression of delightful rurality, is taking the place of images, porcelain vases, &c., that long have been conspicuous objects in almost every parterre. The perfection of beauty to which this work may be carried has been admirably illustrated in Central Park, New York City, and widely copied by gentlemen of taste. Few objects are more pleasing than rustic arbors or even rustic urns overrunning with foliage.

Among the most pleasing vines for embellishment of rural seats are the honeysuckle (*Lonicera japonica* and the trumpet vine), the woodbine, the jessamine and the American ivy. For adorning stone work, the English ivy is very rich, though it grows imperfectly in our Northern latitudes.

The woodbine forms a massive drape for a cottage porch. It has a rich marine hue in summer, and it is very richly tinted in autumn after the early frosts. The Japan honeysuckle is deliciously fragrant, and it retains its dark lustrous foliage until mid-winter. Unlike many climbers this honeysuckle, together with the trumpet vine, is not liable to be infested with insects. The feathery *clematis*, known also by the names of the *virgin's bower* and the *traveller's joy*, is a pretty creeper for walls and fences; and the common hop vine may be made to add beauty to the dove-cote and the martin boxes, when these are placed after the old English manner, upon poles.

The American ivy is one of the most prolific of foliage vines. The leaves when they are young are of a delicate pea-green color, but they become dark and lustrous as the season advances. They are very gorgeous after the early autumn frosts, displaying the richest tints of orange and vermillion. The ivy forms a sort of net-work for old crumbling walls, and it is indigenous to stormy places.

There is a slender vine very common in the Eastern States that is seldom used for ornamental purposes, to which we would especially invite the attention of the florists. It is called the ground nut. (*Apios tuberosa*.) Its foliage is dark, thick, and very graceful. The flowers are remarkable. They are dark purple in color and present a peculiar waxy appearance, in dense predunculate, axillary racemes. Their odor is wonderfully sweet, and it is so powerful and inexhaustive as to fill perpetually the air. The vine entwines itself among low

bushes in its native state. A florist of our acquaintance supplemented the charms of her trellises of roses by entwining these vines among the branches. Her rooms were filled with fragrance whenever the windows were thrown open during the whole of the hot season. The flowers of the ground nut vine last for a very long period. Remember this vine in your summer rambles.—*Working Farmer*.

CLEAN THE CELLAR.—The *Boston Journal of Chemistry* says: "Diphtheria, typhoid, and scarlet fevers, and many other most serious illnesses, have their origin in cellars both in city and country; and we can do our readers no greater service than to urge them to see that at all times they are in a dry, sweet, wholesome condition. Why should farmers and farmer's families, living in the country away from the pestilential vapors of the cities, be so subject to attacks of malignant diseases? There is a reason for it, and we can point it out. They arise from the indifference manifested to the observance of hygienic rules and the violation of sanitary laws. Cleanliness is essential to health, and it is just as necessary in the country as in the city. A family living over a foul cellar is more liable to be poisoned and afflicted with illness than a city family living in its polluted atmosphere, but without cellar or basement filled with fermenting roots and fruits. There is far more sickness in the country among husbandmen than there ought to be. With plenty of pure air, water, and exercise, the evil imp Disease ought to be kept at bay, and he would be better if an observance of certain hygienic conditions were maintained. Bad conditioned cellars, small, close sleeping rooms, stoves—these are all agents of evil, and are fast making the homes of farmers almost as unhealthy as those of the dwellers in cities. Are not these suggestions worthy of consideration?"

ON THE ART OF GARDENING.

BY THOMAS HOPE.

WHAT was, in the earlier times, the origin of the garden? The wish that certain esculent plants and fruits, which in the waste field and the wide forest are scattered at great distances, in small quantities, intermixed with useless vegetables and fruits, precarious in their appearance, and stunted in their growth, difficult to collect, and scarce worth the gathering, might in a nearer, a smaller, and a more accessible spot, be better secured, more abundantly produced, kept clearer of the noxious herbs and weeds which destroy their nutriment and impede their growth. This was, in its origin, the sole object of the entire garden; this, to the present hour, continues to be the principal purpose of that essential portion of the garden, devoted to the uses of the kitchen and the table.

In these parts of the garden then, which are destined immediately for the gratification, not of the eye, but merely of the palate, it is only in proportion as we more fully deviate from the desultory and confused dispositions of simple nature—firstly, by separating the different species of esculent plants, not only from their useless neighbors, but from each other; and secondly, by confining the vegetables thus classed in those symmetric and measured compartments, which enable us with greater ease to discover, to approach, and to improve each different species in the precise way, most congenial to its peculiar requisites, that we more fully attain that first of intellectual beauties, which, in every production, whether of nature or of art, resides in the exact correspondence between the end we propose and the means we employ. Nay, if it be true that contrast and variety of colors and of forms are amongst the most essential ingredients of visible beauty, we

may say that even this species of sensible charm is greatly increased in the aspect of a country by the opposition to the more widely diffused, but more vague shades and outlines of the unsymmetrized surrounding landscape, offered by the more vivid hues and more distinct forms of the gay Mosaic work of nicely classed and symmetrized vegetables which clothe these select spots.

Even where the general unadorned scenery is as bold and majestic as in Switzerland, or as rich and luxuriant as in Sicily, the eye with rapture beholds the variety, and enjoys the relief from the vaster and sublimer features of rude Nature, offered by the professed art of a neat little patch of ground, whether field, orchard, or garden, symmetrically distributed. It looks like a small but rich gem—a topaz, an emerald, or a ruby, sparkling amidst vast heaps of ruder ore; or rather like a rich carpet, spread out over a corner of the valley. It appears thus incontrovertible, that in that part at least of the garden which is immediately intended for utility, we incidentally produce not only greater intellectual, but greater visible beauty, by not confining ourselves to the desultory forms of unguided Nature, but by admitting the more symmetric outlines of avowed art, and it therefore only remains to be inquired, whether in that other and different part of the artificial grounds, in later times added to the former, which is directly intended for beauty, and which we therefore call the pleasure-grounds, we shall really produce more beauty, intellectual or visible, or, in other words, more pleasure to the mind or eye, by only employing the powers of art in a covert and unavowed way; in still only preserving the closest resemblance to the interminable and irregular forms of mere nature, or

by exhibiting her additional resources in a more open and avowed manner; in contrasting these more, indeterminate and desultory features of pure nature, with some of those more determinate and compassed outlines, which, indeed, on a small scale, are already found in many of the spontaneous productions of Nature herself; but which on a more extended plan, are only displayed in the works of art. I say, more pleasures to the mind or eye; for the portion of the garden here alluded to, no less than the one before mentioned professes itself to be a piece of ground wrested from Nature's dominion by the hand of man, for purposes to which Nature alone was inadequate; and thence contending that there is the least necessity or propriety in rendering this district, appropriated by art, a fac-simile of pure Nature, independent of any consideration of superior beauty which this imitation may offer to the eye or mind, and merely because, to form a garden, we use materials supplied by Nature—such as air, water, earth, and vegetables, would be absurd in the extreme. As well might we contend, that every house, built of stone should resemble a cavern, and every coat made of wool, a sheepskin. Every production of human industry whatsoever, must, if we trace it to its origin, arise out of one or more definite ingredients of pure nature; and unless, therefore, by the same rule, every production of human industry whatsoever be obliged everlastingly to continue wearing the less regular forms of those peculiar objects of nature, out of which it is wrought, we cannot with more justice arraign gardens in their capacity as aggregates of mere natural substances and productions, for assuming the artificial forms of a terrace or a *jet-d'eau*, an avenue or a *quincunx*, than we can condemn operadancers and figurantes, in their capacity of compounds of natural limbs and features, for exhibiting the artificial movements of the minuet and the gavot, the entrechat and the pas-grave.

If, then, the strict resemblance to the desultory forms of rude nature be not indispensably requisite in the artificial scenery of pleasure-grounds, on account of any invariable reasons of propriety or consistency, inherent in the very essence of such grounds, this resemblance of studious art to wild nature, in the gardens that adorn our habitations, can only be more eligible on account of some superior pleasure which it gives the eye and mind, either in consequence of certain general circumstances connected with the very nature of all imitation, or only in consequence of certain more restricted effects, solely and exclusively produced by this peculiar species of imitation; namely, of natural landscapes through artificial grounds.

Now, with regard to the former of these two considerations, I allow that a faithful imitation, even of a deformed original, is capable of affording great intellectual pleasure to the beholder, provided that imitation, like that displayed in painting and sculpture, be produced through dint of materials, or tools so different from those of which is composed the original imitated, as to evince in the imitator extraordinary ingenuity and powers; but the imitation of a natural landscape, through means of the very ingredients of all natural scenery; namely, air, earth, trees, and water, (and which imitation will in general offer greater truth in proportion as it is attained through greater neglect,) cannot possess that merit which consists in the overcoming of difficulties and the display of genius; unless, indeed, it be an imitation of such a species of wild scenery as is totally foreign to the genius of the locality in which it is produced; unless it consists in substituting mountains to plains, waterfalls to puddles, and precipices to flats; and in that case, on the contrary, the attempt at imitation will become so arduous as to threaten terminating in a total failure, by only offering, instead

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of a sublime and improved resemblance, a most paltry and mean caricature. Since, then, in a garden, the imitation of the less symmetric arrangements of rude nature can afford little or no peculiar gratification to the mind in their sole capacity as imitations, the question becomes restricted within a very narrow compass; and all that remains to be inquired into is, whether, in that garden, the exclusive admission of mere unsymmetric forms of simple nature, or their mixture with a certain proportion of the more symmetric forms of professed art, will give more intense and more varied pleasure to the eye? And, when thus stated, I should think the question would be nearly answered in the same way by every unprejudiced person. I should think it would be denied by none, that if, on the one hand, the most irregular habitation, still, through the very nature of its construction and purposes, must ever necessarily remain most obviously symmetric and formal; if not in its whole, at least in its various details, of doors, windows, steps, entablatures, etc., and if, on the other hand, as I take it, all beauty consists in that contrast, that variety, that distinctness of each of the different component parts of a whole, from the remaining parts, which renders each individually a relief to the remainder, combined with that harmony, that union of each of these different component parts of that whole with the remaining parts, which renders each a support to the remainder, and enables the eye and mind to glide over and compass the whole with rapidity and with ease, fewer striking features of beauty will be found in a garden, where, from the very threshold of the still ever symmetric mansion, one is launched in the most abrupt manner, into a scene wholly composed of the most unsymmetric and desultory forms of mere nature, totally out of character with those of that mansion; and where the same species of irregular and indeterminate

forms, already prevailing at the very centre, extend, without break or relief, to the utmost boundaries of the grounds, than will be presented in another garden, where the cluster of highly-adorned and sheltered apartments that form the mansion, in the first instance, shoot out, as it were, into certain more or less extended ramifications of arcades, porticoes, terraces, parterres, treillages, avenues, and other such still splendid embellishments of art, calculated by their architectural and measured forms, at once to offer a striking and varied contrast with, and a dignified and comfortable transition to, the more undulating and rural features of the more extended, more distant, and more exposed boundaries; before, in the second instance, through a still further link, a still further continuance of this same gradation of hues and forms, these limits of the private domain are again made in their turn, by means of their less artificial and more desultory appearance, to blend equally harmoniously on the other side, with the still ruder outlines of the property of the public at large.

No doubt, that, among the very wildest scenes of unappropriated nature, there are some so grand, so magnificent, that no art can vie with, or can enhance their effect. Of this description are the towering rock, the tremendous precipice, the roaring cataract, even the dark, gloomy, impenetrable forest. Of such, let us take great care not to destroy, or to diminish the grandeur by paltry conceits or contrivances of art. But even these are such features as, from certain conditions unavoidably attendant on them, we would not wish to have permanently under our eyes and windows; or even if we wished it, could not transport within the narrow precincts which immediately surround the mansion. A gentleman's country residence, situated in the way it ought to be, for health, for convenience, and for cheerfulness, can only have room in its immediate vicinity for the more concentrated beauties

of art. In this narrow circle, if we wish for variety, for contrast, and for brokenness of levels, we can only seek it in arcades and in terraces, in steps, balustrades, regular slopes, parapets, and such like; we cannot find space for the rock and the precipice. Here, if we admire the fleeting motion, the brilliant transparency, the soothing murmur, the delightful coolness of the crystal stream, we must force it up in an erect *jet-d'eau*, or hurl it down in an abrupt cascade; we cannot admit so near us the winding torrent, dashed at wide intervals from rock to rock. Here, if we desire to collect the elegant forms, vivid colors, and varied fragrance of the choicest shrubs and plants, whether exotics, or only natives, oranges, magnolias, and rhododendrons, or roses, and lilies, and hyacinths; we still must confine them in the boxes, the pots, or the beds of some sort of parterre; we cannot give them the appearance of spontaneously growing from amongst weeds and briars. Here, in fine, if we have a mind to secure the cool shade and the convenient shelter of lofty trees, we can only plant an avenue, we cannot form a forest. And for that, since we admire, even to an excess, symmetry of lines and disposition in that production of art called a house, we should abhor these attributes in the same excess in that other avowed production of art, the immediate appendage of the former, and consequently the sharer in its purposes and character, namely, the garden, I do not understand. There is between the various divisions of the house and those of the grounds, this difference, that the first are more intended for repose, and the latter for exercise; that the first are under cover, and the latter exposed. The difference should make a corresponding difference in the nature of the materials, and in the size and delicacy of the forms; but why it should occasion on the one side an unqualified admission, and on the other, as unqualified an exclusion of those attributes of symmetry and cor-

respondence of parts which may be equally produced in coarser as in finer materials, on a vaster as on a smaller scale, I cannot conceive. The outside of the house is exposed to the elements as well as the grounds; and why, while columns are thought invariably to look well at regular distances, trees should be thought invariably to look ill in regular rows, is what I cannot comprehend. Assuredly the difference is as great between the eruptions of Etna, or of any other volcano, and artificial fire-works, as it is between the falls of the Niagara or of any other river, and artificial water-works. Why, then, while we gaze with admiration on a rocket, should we behold with disgust a *jet-d'eau*? And why, while we are delighted with a rain of fiery sparks, should we be displeased with a shower of liquid diamonds, issuing from a beautiful vase, and again collected in as exquisite a basin? If the place be appropriate, if the hues be vivid, if the outlines be elegant, if the objects be varied and contrasted, in the name of wonder, how should, out of all these partial elements of positive, unmixed beauty, arise a whole positively ugly? No, there can only arise a whole as beautiful as the parts; and so, those travellers who have not allowed any narrow and exclusive theories to check or destroy their spontaneous feelings, must own they have thought many of the suspended gardens within Genoa, and of the splendid villas about Rome; so they have thought those striking oppositions of the rarest marbles to the richest verdure; those mixtures of statues, and vases, and balustrades, with cypresses, and pinasters, and bays; those distant hills seen through the converging lines of lengthened colonnades; those ranges of aloes and cactuses growing out of vases of granite and of porphyry, scarce more symmetric by art, than these plants are by nature; and, finally, all those other endless contrasts of regular and irregular forms, everywhere, each individually increasing its

own charms, through their contrast with those of the other, exhibited in the countries, which we consider as the earliest schools, where beauty became an object of sedulous study.

But the truth is, that in our remoter climes, we carry every theory into the extremes. Once, that very symmetry and correspondence of parts of which a certain proportion ever has, to all refined ages and nations, ancient and modern, appeared a requisite feature of the more dressy and finished parts of the pleasure garden, prevailed in all English villas with so little selection, and at the same time, in such indiscreet profusion, as not only rendered the different parts insipid and monotonous with respect to each other, but the whole mass a most formal, unharmonious blotch with regard to the surrounding country. Surfeited at last with symmetry carried to excess, we have suddenly leaped into the other extreme. Dreading the faintest trace of the ancient regularity of outline as much as we dread the phantoms of those we once most loved, we have made our country residences look dropped from the clouds, in spots most unfitted to receive them; and, at the expense, not only of all beauty, but of all comfort, we have made the grounds appear as much out of harmony, viewed in one direction with the mansion, as they formerly were viewed in the opposite direction with the country at large. Through the total exclusion of all the variety, the relief, the sharpness, which, straight or spherical, or angular, or other determinate lines and forms might have given to unsymmetrical and serpentine forms and surfaces, we have, without at all diminishing the appearance of art, (which in a garden can never be totally eradicated,) only succeeded in rendering that art of the most tame and monotonous description; like that languid and formal blank verse, which is equally divested of the force of poetry and the facility of prose. Nature, who, in her larger productions, is content with ex-

hibiting the more vague beauties that derive from mere variety and play of hues and forms; Nature herself, in her smaller and more elaborate, and if I may so call them, choicer bits of every different reign, superadds those features of regular symmetry of colors and shapes, which not only form a more striking contrast with the more desultory modifications of her huger masses, but intrinsically in a smaller space, produces a greater effect than the former can display. Examine the radii of the snow-spangle, the facettes of the crystal, the petals of the flower, the capsules of the seed, the wings, the antennæ, the rings, the stigmata of the insect and the butterfly; nay, even in man and beast, the features of the face, and the configuration of the eye, and we shall find in all these more minute, more finished, and more central productions of the mineral, the vegetable, and the animal kingdoms, reigns the nicest symmetry of outline and correspondence of parts. And if art, which can only be founded upon, only spring out of nature; if art, I say, should ever only be considered as the further development of nature's own principles, the complement of nature's own designs, assuredly we best obey the views of nature, and best understand the purposes of art, when, leaving total irregularity to the more extended, more distant, and more neglected recesses of the park, we give some degree of symmetry to the smaller and nearer, and more studied divisions of the pleasure-ground. This principle of proportioning the regularity of the objects to their extent, the Greeks well understood. While in the Medici Venus the attitude of the body only displays the unsymmetrical elegance of simple nature, the hair presents all the symmetry of arrangement of the most studious art; and unless this principle also become familiar among us there is great danger that unable to make the grounds harmonize with the mansion, we attempt to harmonize the mansion with the grounds, by converting that mansion itself into a den or a quarry.

REMARKS ON FIRE-PROOF CONSTRUCTION.

A PAPER READ BEFORE THE NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS, APRIL 6TH, 1863.

BY P. B. WIGHT, F. A. I. A.

MR. PRESIDENT AND GENTLEMEN:— A distinguished member of this body not long since remarked that a fire-proof building was easily defined: "It is a building which cannot burn, and which contains nothing that will burn." Admitting the definition, I do not propose to dispute with the gentleman, neither do I intend to enter into an elaborate and scientific investigation of the subject; to do so would be to essay a task far beyond my powers, and one which might result in stultifying myself and wearying you. The best I can do is to collect some of the scattered results of thought and observation, into what I trust you will consider to be but a rambling dissertation upon a subject which is of great interest to all of us. It is, therefore, less with the desire to display any erudition, than to introduce the subject, and call forth the views of those assembled here, that I have chosen to address you some remarks on fire-proof buildings. In so doing it is possible that I may enter the field of criticism, and may comment upon the works of some who are here present; but whatever I may say in that direction, allow me to assure you, will be said with justice and candor, and an endeavor to follow Matthew Arnold's definition of criticism—to find the best ideas in everything. I will look to those whose experience has been more extended than mine, for a continuation of the discussion of what I may only hint at.

It is very seldom that any building is required for such use that only non-combustible material shall be placed in it; but it is still a fact that fire-proof buildings are often called for, and are needed, wherein large amounts of combustible

materials are to be placed.* To supply such a demand, is one of the most important problems offered to the architect for solution. Of such buildings, are storage warehouses, and stores or shops, wholesale and retail, as well as buildings for certain kinds of manufacturing processes, such as sugar-houses and carriage or furniture shops.

Having devised a building of non-combustible material throughout, the question which next arises is how to keep a conflagration in one part from extending to all the contents of the building. It seems to me, that in buildings for such purposes, the idea of making them only partially fire-proof is not to be considered for a moment, unless, perhaps, the material contained is so highly inflammable that it would destroy the material of the building, even if it is divided into fire-proof compartments, in which case it seems to be folly to go to the expense of fire-proof materials at all. When you know that no part of your building can burn of itself it is evident that every atom of it will offer some resistance to the enemy confined within. I believe, too, that it is impossible to smother or choke a fire once commenced, by the use of closed compartments. Accident or carelessness may leave some openings which will facilitate a draft in some unforeseen way. And even supposing that you have shut in your fire by some arrangement of closed compartments, can you give your compartments less air than a

* But by combustible material, I do not by any means intend what the insurance companies call hazardous, but dry goods, books, and similar things, which will burn independently of the building in which they are contained.

charcoal pit? Close it as much as you will, your confined goods, if the barriers are not forced by the immense power generated by the heat, will at last be reduced to charcoal; for you cannot open a door or window upon such a smouldering fire, but that it will instantly burst into flames. Ships have been brought to port with smouldering fires under their closed hatches, which have been in existence for weeks at a time, while but few have been eventually saved under such circumstances, except by scuttling. Such conditions do not exist with regard to buildings; in them there is not the risk of human lives, which may be saved on shipboard only by closing down the hatches, and scuttling is obviously out of the question.

Store-houses are the only class of buildings which admit of division into air-tight compartments, and there is a practical objection to them in even buildings of this class; but few kinds of goods can be preserved without good ventilation. It seems, therefore, that the compartments should be open and accessible from without, but carefully divided from each other. If so, they afford good facilities to those employed in extinguishing fires; and I think that in a building thus arranged, there would be a more reasonable chance of a portion of its goods being saved.

The division of buildings into horizontal compartments, rather than vertical ones, is so much more desirable, where land is expensive, that inventors have almost exhausted their ingenuity in devising thoroughly fire-proof floors. It is obvious, however, that the division of a building by vertical fire-proof partitions, is a matter so easy of accomplishment, that it is questionable whether the horizontal division, so beset with practical difficulties, so expensive, and withal so much less to be depended upon, even when the best systems of construction are used, is ever economical, even where ground is expensive. I even question whether it is of any use

to build iron floors, or floors with iron supports, for buildings to contain goods; brick piers and groined arches are alone reliable. If you divide horizontally you must have stairways within and windows on the exterior, both of which welcome the ascending flames. You may enclose your staircase in a fire-proof enclosure, and you may put the heaviest iron shutters on your windows, but you must have doors through which to gain access from your stairways, and you must open your shutters when you want light. There is a contingency that these traps may be set when the enemy comes, and then all your expensive floors represent so much wasted capital.

As yet, I believe, that no buildings in this vicinity, built purely for storage purposes, have been constructed entirely of fire-proof materials, except the St. John's Depot of the Hudson River Railroad Company. I am not aware that any attempt has been made in these buildings to stop a conflagration among the goods on storage either by horizontal or vertical compartments. The floors, to be sure, are of iron and brick, non-combustible, but with hoistways; and it is not difficult to conjecture, even supposing that all horizontal openings and iron shutters were closed, what would be the result of a fire raging on one of those floors, hundreds of feet in expanse.

Several fires occurring recently in the Brooklyn warehouses have warned their owners to take extra precautions, even though none of these warehouses are fire-proof, if I am rightly informed. One of the best is known as the Pierrepont Stores, near the Wall Street Ferry, and the arrangement of them is well worthy of notice. These are about three hundred feet in length, and are divided into six compartments by fire-proof party walls; the width of each compartment is consequently about fifty feet, and the length about two hundred feet. The floors are of wood, and it

would have been useless to make them of iron and brick ; for the goods taken in them are mainly sugars; and it would be folly to attempt to arrest a fire of such combustible material in its ascending course, by any practicable device. But what is most interesting in these buildings is that each is fortified against its neighbor. Recently the party walls were carried up about six feet above the roofs, and were pierced with embrasures, through which firemen can play from the roof of one building upon the flames of another, with perfect safety to themselves. Here is an instance wherein capital would have been wasted on the expensive materials required for fire-proof floors.

It is the duty of the architect, as I conceive it, to guide the capitalist in coming to a decision on such points. If he devises economical methods, his commission is lessened, but thereby so much more capital remains unemployed, but ready for investment in other enterprises. It would be foreign to my subject to enlarge upon this point, and show how much more it is to the interest of the architect to study reasonable economy in his works, especially buildings for business purposes ; but I will let the suggestion stand for what it is worth. Perhaps a knowledge of the fact that most members of our profession agree with me in this opinion would go far toward disarming the misgivings of many a client upon the question of commissions.

Buildings for manufacturing purposes next demand attention. Some time since a manufacturer and contractor for iron work remarked to me, that if some one would only put up a large fire-proof building, with good steam power, to be rented out for manufacturing purposes, his fortune would easily be made. I have often thought of the suggestion, and wondered why it had not been acted upon. He said that at that time it would be impossible to hire a fire-proof shop or room, with power, in this city.

Now, there are many occupations requiring delicate, and not easily replaced machinery, or in which are involved elaborate experiments, running for long periods—the derangement of which could not be recompensed by any amount of insurance—for which a fire-proof building would be almost invaluable. The saving of insurance on such a building and its contents would be greater than the interest on the extra cost of fire-proof floors, and would enable the owner to rent his rooms at a lower rate—in proportion to the equivalent given—than could the owners of buildings with wooden floors. The extra cost of fire-proof construction in a manufacturing building is small when compared with that of a bank or public building. The walls and ceilings require neither lath nor furring, and the floors may be of flags or slate, bedded on the brick arches, or what is better, plates of cast-iron bolted to the beams—which will presently be described. All inside finish may be discarded, and iron doors, of No. 16 iron, with light wrought-iron frames, hung to stone templates in the jambs, are the only coverings required for the openings.

Such fire-proof buildings as have been erected for manufacturing purposes have been specially designed for single occupants. The most perfect and the earliest that I know of is a building erected on Vestry street, about ten years since, for the Grocers' Sugar Refining Company. This building, as far as its material is concerned, is absolutely fire-proof. It is most remarkable for its floors, which are made of plates of boiler-iron, riveted together and secured to the beams in large sheets. This is the most simple system of floor construction I have ever seen, and has many advantages. But I have not seen the building in use, and do not know how the floors answer the ends for which they are intended.

Some of the new buildings for the various gas works in this city are fire-proof. The best are those of the Metro-

politan Company, at the foot of Forty-second street, North river. But they are at best, only sheds—brick walls, with iron shutters and roofs. Large, open, and well ventilated, they serve their purposes well; but they can hardly be called architecture.

The most extensive attempt to build a fire-proof building for manufacturing purposes was the enterprise of Harper & Brothers. This was one of the pioneer buildings of the new dispensation. The Harper girder is well known; it is an ornamented cast-iron beam, with a tie rod, and was the father of the truss beam, now so extensively used for supporting the rear walls of stores. It has been succeeded by the built-up beam, now generally used for girders, and the double rolled beam. It was eminently a constructive beam, using iron according to its best properties, cast-iron for compression and wrought-iron for tension. I doubt not that it will some day be again used where girders are required. The built-up beam was invented for the restorer of the "pure" styles, who think that furring strips, laths, plaster and a modicum of run moulding, not to forget "a neat panel on the soffit," to be a good substitute for the honest lintel of the Greeks, and more artistic than the constructive beam which James L. Jackson & Bro. designed and executed for the Harpers. When men are no longer ashamed to display good iron construction, and bend their artistic conceptions to their constructive skill, we may hope to see something like the Harper beam revived, and decorated in a manner befitting its use. But I fear that this will be done when a more rational generation than our own holds the sway. But to return. In Harper's building, as in the Cooper building, the deck beam was used for the floors, and brick arches, such as those now in use, were employed. The deck beam has also gone out of use. When first employed, iron beams were not made for houses, but for ships. The I

beam has replaced the deck beam for the former purpose. And in this connection, I would suggest an inquiry into the practicability of using the deck beam inverted. It has always seemed to me that the broad flange would best sustain compression, and that the roll, having the form of a round bar, would best resist tension. The matter of the bearings is easily remedied by a cast-iron shoe on each end of the beam and bolted to it. This shoe, with a broad foot, would answer the purpose both of template and anchor, and if made to project from the wall and assume an ornamental shape, might become a visible and constructive bracket. The deck beam inverted would evidently present the best appearance from below in cases where the flooring is placed on top of the beams—the various methods of doing which I propose to discuss further on. Should the deck beam come again into use, it might be made of more ornamental form without detriment to its strength. The bottom roll or flange could be moulded in various ways.

But, except in so far as the floors are concerned, the Messrs. Harper's building is far from being fire-proof. There is much wood-work in its inside finish, and the contents being of a highly inflammable nature, I fear that fire would have its own way in that building unless early checked.

Besides these buildings two partially fire-proof publishing houses have been built; the Times Building and the Ledger Building; but there is nothing in either that it is pertinent to my inquiry to mention;—they are manufacturing buildings in the same sense that the Harper's Building is, but the former might as well come within the class of office buildings.

The fact of the American Bank Note Company having taken quarters in the Mutual Life Insurance Building, upon their expulsion from the Custom House, illustrates what my friend mentioned

about the demand for buildings for delicate and elaborate processes, such as the art of bank note engraving, and goes to show that such branches of business are obliged to settle in buildings erected for other purposes. The work of a bank note company is in some respects a heavy manufacturing business, which any one will believe who examines the powerful boilers and engines in the cellar of the Mutual Insurance Building; but it is also a delicate artistic business, requiring steady floors, good light, and absolute safety from fire, to the valuable materials used and kept in it, which not money alone could replace.

From the Bank Note Company we come next to the Assay office whose risks are similar. I am informed that it is absolutely fire-proof, but I have had no occasion to visit it.

Of Banks and Insurance Buildings we certainly have a large number which are to all intents fire-proof, though but few are thoroughly so. It is generally admitted that such buildings are not in danger from their contents, and to this belief may be ascribed the fact that we already have so many of this class. The Continental Bank, the American Exchange Bank, the Mutual Life Insurance Company's building, the Park Bank, and the City Bank building, recently remodeled, are absolutely fire-proof. Nothing less than a bonfire of all the furniture, books, and papers that could be collected together in any one room of any of these buildings would endanger its destruction. They are safe from any ordinary casualty. But in all the rest there is enough wood-work to make the word "fire-proof," as applied to them, of very doubtful significance. To show what a practical eye the Insurance Companies have, let me say that in nearly all the so-called fire-proof bank buildings the rates of insurance are as high as in ordinary business buildings. The rates are unusually high in the building which I happen to occupy, on account of a well hole in the

centre which is trimmed with wood, and would carry a fire through the whole building in an instant. What I might say in relation to buildings of this class will be comprised in some practical suggestions upon fire-proof buildings generally. Let us then look for a few moments into the matter of constructive details.

And, firstly, how shall floors be constructed? Before the "iron period," when our Washington Capitol, our City Hall, our old Exchange and Custom House were built, the Roman Mediæval vaults only, were used—either of stone or of brick plastered. When the width of a room was too great for one span, granite columns or brick piers were used, as in our old Exchange, now the Custom house. The floors above the vaults were leveled up and paved with flags or marble tiles. As far as grace, strength and absolute relief from the dangers of fire were concerned, this was a perfect system. But now space is demanded; there must be no more heavy piers and no great thickness of floors. We are therefore forced to use a material which, though not combustible of itself, will do little work if exposed to great heat; and in this is seen the great difference between our fire-proof buildings of the brick period and those of the iron period, and the inferior fire-proof qualities of the latter. The problem now is, to use the minimum of brick and the maximum of iron. I think, therefore, it must be conceded that with the best we can do with this material, there is danger; and the problem might be put thus: "Given Iron, make as nearly fire-proof buildings as possible out of it." What, then, has been done with it thus far? For columns, we have used cast tubes of all shapes and sizes and the wrought-iron pillars of the Phoenix Iron Company; for girders, we have used compound beams of cast iron, with wrought ties—built up beams of various forms of rolled and plate iron, bolted and riveted together—and common rolled beams, used

double; for floor beams we first used deck beams for wide spans and railroad iron for narrow spans; these have now been superseded by the I beam of various sizes. The Rolling Mills now have on their circulars I beams of great dimensions and suitable for girders, but refuse to fill any but large orders; indeed, I believe that only one mill has rollers for beams larger than thirteen inches, while the others will not put up machinery until they get large enough orders. So we are thus far deprived of large smooth beams of one piece, for girders of long span—beams which no one would desire to hide from view, but which might honestly tell their use to every beholder. For supports between beams we have had Peter Cooper's *terra colla* pots and the four inch brick arches. The former are out of use and the latter are almost universally employed. Corrugated iron—first used in the Columbian Insurance building by Mr. Diaper—has also gone out of use. The destruction of the Fulton Bank, a so-called fire-proof building, sealed its fate as far as floors are concerned.* We have also had the experiment of stone floors in the American Exchange Bank, by Mr. Eidlitz, and repeated by another architect in the Mutual Benefit Life Insurance Building, at Newark, N. J. The stone slabs, brick arches, and the Parisian floors—of plaster or concrete, bedded upon bar iron gratings inserted between the beams—are the only practical systems of fire-proof floor construction, now in use. The only attempt to lay the floor on the beams, of which I have knowledge, is in the sugar house above mentioned. This has suggested to me several methods of laying rigid floors upon beams at considerable spaces (three to five feet) from one another. Preliminary to so doing, I have above suggested the revival of the deck beam, or the I beam with a better form for the

bottom flange, and the adoption of cast-iron shoes for the bearings.

The objections to the brick arches are that their great weight requires heavier beams than would otherwise be used, and that the form of their soffits is not beautiful; for they have the appearance of a long succession of little wagon vaults, requiring a resort to the doubtful expedient of furring the ceiling with iron lath. I think it might be objected to the French system of floors, that the expense would be too great, plaster being a dear article with us in comparison with its price in France, while our own cement has not the requisite properties to enable it to be substituted, besides being almost equally costly. The stone slabs, of Mr. Eidlitz, are the only rigid material thus far used successfully with iron beams, and could be used to better advantage if laid on the beams rather than resting upon their lower flanges, as is done in the American Exchange Bank. They are doubtless the handsomest material that can be used for this purpose, but are open to the objection of being heavy and expensive—where expense is a question, and utility only is sought—requiring heavy beams and calling for elaborate cutting on the under side. It will be pertinent to our inquiry, therefore, to ask if there are any other rigid materials adaptable to this purpose, and possessing the desired quality of lightness and cheapness. A former draughtsman of mine, now a member of the Institute, first suggested the use of slabs of slate, about two inches in thickness, for spans of four feet, and thicker or thinner in proportion to the distance of the beams from centres. I give his suggestion for what it is worth. But it led me to believe that we would eventually come to cast-iron as the practicable material for this purpose, possessing the requisite qualities of lightness and cheapness and capable of being bolted to the beams, thus answering all the purposes of flooring and bridging. Cast-iron plates may be used for floor-

* (That disaster was owing also to the fact that the beams, other than girders, were made only of No. 12 sheet iron with flanges of 2 inch angle iron).

ing in two ways; first, when deafening and finished floor covering are required; second, when neither is required, as in manufacturing buildings, wherein a reasonably smooth flooring is required, and a few planks, laid where workmen habitually stand, will answer the purpose of non-conductors of heat. Experiment must determine the minimum quantity of iron (in proportion to the strength required) to be used in the floor plates. In obtaining the proper form for strength, and to ensure true castings, the bottoms of the plates will naturally be covered with raised flanges, except at the edges, where they bear on the beams. These flanges or ribs may assume a decorative form, either a plain diaper or a larger pattern to form a complete design for the ceiling when many of them are combined. By a judicious arrangement of the flanges the actual thickness of the iron may be reduced to three-eighths, or a quarter of an inch. When deafening is required, strengthening flanges may also be cast on top of the plates, and consequently the beams can be placed at wide intervals. The flanges on the top will then serve to keep the concrete, used for deafening, in its place, and avoid the cracks which might occur in a large surface of cement. The deafening may be of any thickness required, and will serve as a bed for the floor tiles. All that is then required for the underside is judicious decoration of the beams and floor plates. When deafening is not required, as in manufacturing buildings, the tops should be smooth. It has been objected by a manufacturer, to whom I explained this system of construction, that the floors of iron would be too cold for the feet of workmen. But it would be very easy to put down platforms of wood where the men habitually stand. Besides, when the lower story is heated, the stratum of hot air immediately under the ceiling would naturally keep the floor at a higher temperature than that of the air in the room, and the greater conductivity of

the iron would rather tend to warm the feet of those who stand upon it. The plates, in all cases, being bolted to the flanges of the beams, would serve as bridging for the floors.

By the above-described construction of floors, I would attempt to get rid of the obnoxious and expensive iron lath, so generally used. But it is more difficult to avoid their use on side walls, when the walls are to be plastered—and let me say here, that there can be no excuse for plastering the side walls in a fire-proof building, except for economy's sake. The easiest and by all means the cheapest expedient when plastering is required is to build four inch walls, secured to the main exterior walls by iron straps. These will not conflict with the building laws, provided you build your walls thick enough at the outset. There is, however, no better way in which to finish interior walls than to line them with stone or marble, or both combined. Where decorative effect is desired, I would use stone with marble panels. Our native quarries now afford stone light enough in color to set at rest all objections that may be made to its use on the score of light. But if those should hold good the material might be marble paneled with marble, the former white, and the latter colored. Obviously the cheapest material for wall covering in natural materials would be slabs of white marble. Let us then make some comparison of figures, and see what can be done with this material. Iron lath, of the form generally used, cost \$1.25 per foot. Three coat plastering costs nine cents per foot. A responsible dealer in marble informs me that he will put up inch slabs of Italian veined or Vermont marble for one dollar and a half per foot. Which, then, would you choose, polished marble at \$1.50, or plaster, as good in appearance as that in any tenement house, at \$1.34? This is a fair comparison for exterior walls or ceilings. Italian marble slabs can be procured in

any quantity, from eight to nine feet long and three feet wide. In a room fifteen feet high, allowing four feet for wainscot and two feet for cornice, you may line your walls with one length of marble.

What treatment do we now give to doors? We build brick jambs with wooden or iron lintels, as if we would trim the doors with wood. We then put up cast iron jambs, rivet to their edges pilasters or achitraves of the same material, and then surmount the whole perhaps, with a cast iron cornice and pediment. Some have gone so far as to inlay the panels of the iron work with bits of colored marble, thus heightening the effect of the already rough finish of the iron, a roughness which the best foundrymen have been unable to prevent, and which, it would cost untold money to reduce down to the smoothness of ordinary work in pine wood. In one of our most pretentious houses on Fifth Avenue, they are now putting up jambs, architraves and cornices made of sawn slabs of marble or marble boards, in the same manner in which wood and iron have been used. And what does all this amount to? In the category of shams, there is no equal to this monstrous succession. You have imitated a Greek or Roman architrave and cornice by a wooden sham, your wooden sham has been imitated by an iron sham, your iron sham has been imitated by a marble sham; and what is the result? You have kept the form all along; you have come back to the original material by a succession of imitations, and have at last a shell without meat, marble carpentry instead of marble architecture. In all the stages of your attempt to revive the old forms, you have sham imitation of shams down to the final achievement of your carpenter in marble. Next must follow, I suppose, the imitation marble-vender, who will crown the whole fabric of shams and give you something which can as much be called architecture as

Mr. Shoddy's painted "red backs" and "blue backs" resemble standard literature. I offer no original suggestion to remedy this condition of affairs. Go back to your old Greek, go back to your old Roman models, if you like them, and seeing how they are built, go and do likewise; but spare us these sham contrivances. Set up your door posts and plant your lintel upon them, whether for exterior or interior use, and carve them to suit your fancy. They will be at least *good* so long as they be genuine and strong. Then figure up the cost of this kind of work, and see how much you have saved for your clients.

In conclusion, let me urge you to study diligently the various problems affecting this subject, which, in your experience, are continually offered for solution. In so doing, look mainly to a practical solution of the questions which may arise, and free yourselves from all consideration of so-called rules of art, which might control you. The development of architectural design was no less affected by local and circumstantial conditions, with the ancients, than it is with us; but the conditions at the present time are essentially different from, and decidedly more various than those which controlled our ancestors, whether of the classic or mediæval period. Whatever may have been achieved by art in those times, was the result of, and co-ordinate with the practical solution of problems then offered.

We have ignored the conditions which specially affect us, and the result is that our architecture, for whatever purpose, is without originality, and wholly irrational. As long as we allow ourselves to be governed by rules of art founded on the experience of the past, and precedents established by conditions which now do not exist, we need hope neither for good construction nor good art. The attempt to engraft the traditions of the past upon the practical work of this century has resulted in failures involving the waste of hundreds of millions of

capital in this country alone; I might name from memory a score of buildings, many of them the most prominent, and all the most costly that have been erected, in proof of this assertion. I would commence with our national Capitol, in whose dome may be seen the most flagrant attempt in all modern time to perpetuate a traditionary style in a material entirely different from that in which the style was developed; so different that the foundations under it could not carry the superstructure, if it were erected of the material for which it would appear to have been designed; and for want of foundations of sufficient breadth, even to carry the iron work, it has been necessary to carry the whole exterior iron colonnade upon iron brackets, concealed beneath what appears to be the podium for the whole dome, but which is in reality a box of thin plates of cast iron, secured to a light framework, built out over the roof of the building.

In erecting modern fire-proof buildings, especially in so far as iron work is concerned, all the conditions imposed upon the architect are different from those which existed in past ages. The same may be said of the use of iron in any building. Subserviency to style, when the material used is not such as was the controlling element of that style, is destructive to all good art; for there can be no truly artistic effect except that which is produced by the best use of material, and its decoration in best accordance with its nature. If the use of iron is ever to lead to the erection of buildings worthy of being called works of art, such a result must be attained only by the recognition of this principle.

The best thinkers have doubted whether there can be any such thing as architecture in iron, assuming, of course, that to be called architecture, the material must be constructively used; and there is good reason for these doubts. An iron building does not al-

ways require the force of gravity to maintain the cohesion of its parts; it possesses such properties that it may be swung in the air or balanced on a single point, if it is necessary so to do. It is a machine admitting of as little decoration as a steam engine or a printing press. If iron alone were used for buildings, constructive necessity and economy combined, might lead us to build houses like steam boilers or water tanks.

What has been done thus far toward the erection of iron buildings on constructive principles? We can only recur to the buildings of the Crystal Palace pattern. We had a beautiful one in New York, admirably constructed, and well designed for its purpose; but even that building was decorated in the Moresque style, perhaps as nearly appropriate to the material employed as any that could have been selected. Here originality in treatment failed, just where it was wanted. The same constructive principles were involved in the design of this building which would have been involved in the erection of a fire-proof building. In this respect it was a success.

In the erection of fire-proof buildings, we are forced to do the best we can with iron while using it in the most varied capacities; but when its use can be spared, let me entreat you to rid yourselves of it; where it must be employed, use it rationally and constructively; but better not decorate it at all, than imitate styles not in harmony with its constructive properties. As all iron must be painted, I am inclined to believe that the best method of decorating it is in colors; for this treatment the iron must be plain and simple, and the colors may be proportionately brilliant. With regard to other materials, I would suggest nothing more than is said above—in all things build rationally. First, let your work be strong and well balanced—no part too heavy—no part too light. Then decorate it in harmony

with its constructive features, never concealing materials, except where necessary to protect them, and emphasizing the main lines of the construction by ornamentation. Thus only can the great problem of the day be solved, and the fire-proof architecture of the nineteenth century be made worthy of a rational and progressive age.

NOTE.—An inspection of HARPER & BROTHERS' building, since writing this paper, has convinced me that the principle of division into horizontal compartments has been carried out more thoroughly in it than in any other building of the kind. There are no openings through the floors. It contains neither interior stairs nor hoistway; both are on the exterior. The stairs are in an isolated tower approached by bridges, and the hoistway is without enclosure. This arrangement is however extremely inconvenient.

THE NEW MERCANTILE LIBRARY, PHILADELPHIA.

THE history of the origin of public libraries is simple. Very few persons who possessed a desire to own books of great value could, in early times, afford to gratify their wish, owing either to want of the necessary means, or the very great scarcity of many works of intrinsic value. Before the invention of the great art of printing it is well known that all communicated learning was, of necessity, confined to manuscript on vellum. And that the only mode of repeating books was by transcription. The number of copies being extremely limited, it became necessary to have public places at each of which a copy might be placed for the use of those who desired to read, and as that number was in those days limited also, it was customary for some man of learning to read aloud to an audience.

These folios of manuscript, in time, accumulated to thousands, and the places of their deposit became institutions, and received the name of *librarium*. The term "librarian," however, was applied in those days to the transcriber of books (*librarius*), rather than to the custodian, the latter officer being

entitled *custos librariarum*, and who was nothing more than a janitor.

The enormous impetus given to education by the invention of printing, although it multiplied copies of books to such an extent as to render them cheap enough to become the property of individuals, still public libraries suffered no diminution, and the very increase of the draught seemed to promote the thirst for information, especially in that class in whom a taste for reading was controlled by a limit of means to become possessed of the necessary books. And although in our day the newspaper, the journal, and the serial, do much to disseminate knowledge among the millions, yet are libraries as much an institution of positive necessity as ever; for, in fact they whet the appetite for reading, and the brief paragraphs and condensed essays editorial are but so many stimulants to more extensive acquisitions of information. The taste grows, and the patronage of libraries increases, and such a progress must continue and enlarge whilst the mind of man lives to accomplish the task set by Him in whose likeness the favored being is made.

The history of libraries is one of great interest to the lover of mental progress and the active civilization of our race, and might well call out the most industrious efforts of learned writers to do it justice. However, our business just now is with a local event—the inauguration of a new building by a most popular institution, the MERCANTILE LIBRARY of this city, which took place on the 15th of the past month, in the presence of a large and intellectual number of visitors of both sexes.

The rise and progress of this admirable institution is interesting. Started in 1822 in a small second-story room, with few books and fewer members, pinched to pay the rent of \$150 per annum, by degrees it gained vigor and steadily advanced to its present position, occupying now a building admirable in

all the arrangements of room, light, heat, and ventilation.

This spacious building, occupying a prominent position on Tenth street, north of Chestnut, in this city, was purchased and fitted up at a cost of a quarter of a million dollars, and possesses a choice collection of books amounting to fifty-two thousand volumes, besides a well supplied news room, where will be found a great variety of journals from all parts of the civilized world, together with magazines, reviews, quarterlies, and annuals in abundance. The ladies having a separate department to themselves, unapproachable by the masculines.

The arrangement by which the reading rooms have been studiously kept in the rear of the building out of the reach of street disturbances, is one which gives it a great advantage over the public libraries of most other cities.

There is a well furnished chess room for the lovers of that mental game, and conversation, waiting and other rooms requisite to perfectly complete a truly desirable city institution.

We understand that the membership exceeds fifty thousand, and judging from what has been done, there is no reason to doubt its ultimately doubling that number in so large a city as this.

ARTIFICIAL STONE.—At the recent meeting of the Polytechnic Association of the American Institute, Mr. Thomas Hodgson exhibited and explained two methods of manufacturing and moulding artificial stone ornaments, blocks, etc., for buildings. One of these is prepared by treating lime with a solution of four ounces of oxalic acid in a gallon of water, thus producing an oxalate of lime, which is mixed with from two to four times its weight of sand. In this condition the material is a moist, friable powder. It is then moulded to the required form in Plaster-of-Paris moulds, removed from the latter, and suffered to

dry. It is then preferably placed in a bath of dilute oxalic acid, which causes it to harden throughout, after which it is ready for use. In making the other variety, the inventor treats the oxalate of lime with a solution of silicate of potash, thus bringing it to a semi-fluid condition, whereupon it is poured into moulds and suffered to indurate.

Dr. Van der Weyde said that the oxalate of lime, being one of the most insoluble substances known in chemistry, its employment in the fabrication of artificial stone was a lucky thought. The use of potash and soda compounds for such purposes had been extensively attempted with very poor results, but the oxalate of lime was free from objections which hold good against such compounds.—*Railroad and Mining Register*.

THE NEW TREASURY BUILDING, at Washington, D. C., is now completed. This addition or north wing of the Treasury building is 65 by 195 feet, and occupies the site of the old State Department. The entire Treasury building covers an area of 520 by 278 feet, that is 144,550 square feet, or three acres and a half, including two large courts. On the eastern side of the building is a colonnade of thirty pillars, extending 336 feet north and south. On each of the other sides is a portico, each shaft of the columns of which is a monolith or single block of stone, 32 feet in height, and 4 feet 6 inches in diameter, that is 14 feet in circumference. The buttress caps, which partially inclose the steps of the porticoes, are single slabs of granite, 20 feet square by 2 feet thick. The granite was quarried on Dix's island, off the coast of Maine, and the larger slabs were taken to Washington in the rough, and there dressed. Fronting the north entrance is a fountain, the base of which is 12 feet in diameter, and the height 5 feet. It was cut from a single block of granite.

CORRESPONDENCE.

It must be distinctly understood that we do not hold ourselves accountable for the opinions of correspondents.

WASHINGTON,

July 20th. 1869.

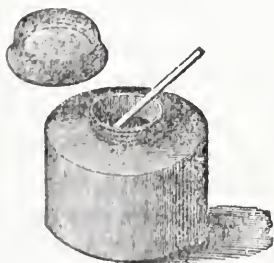
"DEAR SIR:—Give your readers in your notes on Drawing and Drawing Materials, information that if a little powdered borax (borate of soda) is put into the water with which India Ink is rubbed up, and the mixture is kept in a tight bottle when not in use, it will keep sweet for months.

"The ink with which this is written was rubbed one year ago, and has sufficed for all my drawing during the past twelve months. A hard rubber ink bottle and screwed top has preserved, and it flows well, and the fragrance of the musk is as pleasant as when it was first rubbed.

"I have used the drawing pen for nearly forty years, and only a year ago was, by this receipt given me by a friend, relieved from the trouble of rubbing ink for every day's work.

"Yours respectfully,

"M. C. MEIGS."



We have assumed the liberty of giving the name of the writer of the foregoing excellent suggestions, in order to inspire learners with additional enthusiasm by showing them what an interest is taken in their progress by one who has attained to such a high position as the Quarter Master General of the United States Army, and we trust that Major General Meigs's solicitude for art education may

be emulated by many others, capable (if willing) of doing the cause an occasional service.

OMISSION.—In the preceding number of the REVIEW we overlooked the name of the architect who designed and superintended the *Atlantic Hotel*, of which we gave an illustrated description in the article on our "Sea Bathing Resorts." Unrequested by that gentleman, we think it but proper to give the credit to Mr. JOHN STEWART, Architect, of this city.

WEST PHILADELPHIA,

June 21st, 1869.

SIR:—It is to be hoped that at some time or other, before the appearance of cholera shall compel attention to the matter, we may see a move made in the direction of public baths. Is it not a little singular that our people of means who acknowledge the healthful necessity of bathing, and are lavish of expenditure to secure it in its utmost salt-water purity, do not seem to be aware of the advantage that blessing would be to hundreds of thousands of their fellow-beings, too poor to provide it for themselves. In winter we have Soup Associations, and other charitable societies. In summer can we not have Public Bathing Societies, just as necessary to the health of our community?

There are surely thousands who would subscribe their mite towards it; will not the millionaires lead off and set the ball in motion?

A CITIZEN.

Yes, we certainly think they ought, and we have not the slightest doubt but that they will, as soon as the coming man, who is to lead in this matter, shall make his appearance. Let us hope that person will soon be on hand.

NEW YORK,

July 8th, 1869.

MR. EDITOR:—Is it not a most unaccountable fact that the New York Post Office structure, which was to have been commenced some two years since, is as seemingly a myth as one of those “castles in Spain,” of which we all have had at some time of our lives an idea. The site was duly purchased by the United States Government, designs were called for and provided in most eccentric profusion, and the select, if not elect, among the eighth-inch sealed suggestions were liberally paid for in awarded premiums. In fact all that is necessary to trumpet forth an advance was done. Where, then, is the new POST OFFICE? Out of sight—for, even the purchased site itself is not a certainty, then how

should we expect to find the Post Office over ground when the ground is not yet decided on.

That Treasury Building at Washington is just now finished, after a lapse of time which makes gray hairs come on in unbidden numbers. Will the infant born this year, behold the promised New York Post Office before his growth of manhood is doubled into

“Lean and slipper’d Pantaloon?”

Alas, the “temporary” addition to that old Dutch church on Nassau street has but too truly proved a prediction, and we of the Empire city will either have to put up with the present arrangement, or build a postal structure of our own. It is evident now that the act of Congress, in this case made and provided, is but

A DEAD LETTER.

QUERIES AND RESPONSES.

SARAH B.—In the case you mention, the lightning rod was secured to the wall of the house by iron staples. There was nothing to hinder the electric fluid from turning off on one of these, as it actually did. Accidents of a like nature are constantly happening, and where sufficient precaution is not taken it would be far safer to have no conductor.

S. T., asks, is there any bank lock, of how many, and whatever combinations, that is absolutely secure against thoroughly posted and prepared burglars? We doubt that there is. For years the Bank of England trusted its vaults, filled with treasures, to the celebrated *Chubb* lock. Yet that ingenious Yankee, Hobbs, opened it in a surprising short time. The fact is—what man’s ingenuity can make, man’s ingenuity can also unmake.

C. G., Cincinnati.—We perfectly agree with you; the dwellings of this day are really combustible, and highly dangerous; much more so in fact than before

burning fluids came so much into use. We also agree with you that the roofs of houses should not be of a material so liable to take fire on the occasion of a pyrotechnical display, or the passing of a spark-emitting locomotive.

Shingles could be easily rendered fire-proof by steeping them, before use, in a strong solution of alum. But most people would willingly “lose the sheep, to save the pennyworth of tar.”

R. D., Baltimore.—The silica coating of any building material renders it very durable. It is the combination of carbonate of lime, or chalk, with silicate of soda, or what is more commonly known as “soluble glass,” and by the old chemists called “oil of flint,” which, under heavy pressure, produces extraordinary hardness, and causes the great adherence of this cement to iron, brick, stone, or wood. And it is but one more proof of the practical property of the silicate, when applied to purposes such as those in which building most requires its valuable aid.

W. A., Ellsworth, Maine, asks for information as to the best manner of polishing instruments. We would recommend his getting a piece of buckskin and straining it on a square stick, covering one surface with pulverized rotten-stone, or whiting, perfectly free from "grit." For the instruments in which ink is used, having unscrewed and opened the hinged joints, clean off the ink first with a wet, then with a dry rag. Next rub the blades on the coated side of the buckskin, and lastly on the plain buckskin, until the appearance is satisfactory. We repeat that the pens should not be put away wet, but be carefully dried and rubbed on the buckskin after use. A drop of watchmakers' oil on the screws and springs occasionally, will tend to insure the long and good service of in-

struments. Velvet is the best bed for them in the box; and the mould of their tray would be better cut out of cork than of wood. Any one can fit up his own instrument-case to suit his wants. Our advice is to buy only the instruments you have use for, *and get the best*, keeping them in constant order.

L., New York—We agree with you, the names of streets should be painted on the lamps, and when a light of glass is broken and replaced the name should also be replaced.

S. R., Reading, Pa.—The idea is not new. Nay, it is as old as the hills. The ancients used hot air flues under their tiled floors. As long as we use boarded flooring we cannot do likewise, for reasons which any insurance office will freely give you.

PUBLICATIONS.

WE have pleasure in acknowledging the receipt of the first number of *THE ENGINEERING AND MINING JOURNAL*, a weekly publication which was most desirable to our civil engineers in this country, who have hitherto had to depend for professional information on European sources. The *American Journal of Mining* was a popular periodical, and this prefixed addition to and modification of its title will go far to increase its well earned fame; for, judging by the specimen number, (and we know that cannot do its future full justice,) this new effort of Messrs. Western & Company is already a success as a most welcome co-laborer in the great constructive art. We tender it our best wishes, and place it on our exchange list.

MOORE'S RURAL NEW YORKER is an old and well tried friend of everything pertaining to agriculture and domestic economy. No country can boast of better serials of this class than ours, and foremost amongst the best we conscientiously place the *Rural New Yorker*. In its issue of July 10th, we find an illustrated suggestion for "a roomy house," in which we detect some defects which render its execution inadvisable. There is no provision for chimneys, and the stairs are impracticable. Such a house would be far more expensive than comfortable. However, it is pleasing to see men ready to contribute their mite to the general fund of information on a subject so intimately connected with home life and happiness.

THE SCIENTIFIC AMERICAN comes to us with its full share of the practical and the useful, amongst which we would particularly note an improved brick kiln. It has often surprised us to see the clumsy way in which bricks are usually burned and the serious waste of fuel arising from the loss of such a large percentage of heat, not to speak of want of uniformity in baking or burning. The kiln to which we allude is decidedly good and greatly superior to all its foreign predecessors, even Hoffman's, which it more nearly resembles.

HEARTH AND HOME, with all its attractiveness, is regularly on our table. This periodical is most creditable to

the illustrated serial literature of our country, and we are satisfied of its being a fixed fact, from the evidence before us of the liberality of its publishers and zeal of its gifted editors and staff of contributors. The prize song is a gem well worthy of a fitting setting in music equal to its own.

THE PRINTER'S CIRCULAR for July is filled with the interesting proceedings and intense enjoyment of the recent meeting of the National Union at Albany.

THE AMERICAN BUILDER for July has its usual amount of racy readings, its smart comments, and general information. It speaks well for the spirit of the western architects that our Chicago contemporary has laid in its foundation, and goes on with the work.

DESIGNS FOR STREET FRONTS, SUBURBAN HOUSES AND COTTAGES. By Cummings and Miller. This is a quarto volume containing fifty-two plates, with letter-press description of details for interior and exterior ornaments required in domestic architecture and the designs for the same. The former to a scale of a quarter inch, and the latter three-quarters of an inch to the foot. Besides this several designs are given for villas, country houses, and cottages. But the main advantage this work has over most of its predecessors, is in the very full and exhaustive hints, suggestions and instructions it gives to those in need of such; by which any practical man can readily apply any required embellishment to the house he proposes to construct. In fact the book before us supplies a very great want, by presenting to the builder remote from the professional aid of city architects an array of useful practical information which is inestimable to him, and is most desirable to the progress of tasteful construction throughout this wide country. The plates are unexceptionably executed, and the evident care with which this excellent guide to practical building has been put through the press renders it a most fitting work for those to whose use it is so well adapted.

We highly recommend it as a faithful monitor and admirable assistant of the carpenter and builder. A. J. Bicknell, Troy, N. Y., is the publisher.

THE
ARCHITECTURAL REVIEW
AND
AMERICAN
BUILDERS' JOURNAL.

MONTHLY REVIEW.

THE FUTURE OF OUR ARCHITECTURE.

THE greatness of the undertaking, just completed, of bringing the two great oceans of the world nearer, and rendering their shores of easy access to each other, can scarcely be comprehended even in this age of wonders. We read, with momentary surprise, of the superhuman difficulties which have been met and overcome by our engineers, but we no more understand them than we do the character of the rugged surface of the moon, or of the intervening space which lies between that planet and our own. It is now some forty years since the Atlantic was successfully crossed by steam navigation; and during that period we have not been able to reduce the time of passage from America to Europe to less than eight days. In scarcely forty days from the driving of the last spike, the Pacific Railroad is crossed in something less than a week from eastern to western shore! But, we are not now considering the advantage of land carriage over that of water, but just commenting on the progressiveness of the magic age in which we live.

What does all this contracting of space and lessening of distance tend to? Surely it means to draw men from the distant extremes of the earth towards some centre where they can settle down in union as on a more eligible spot than that they were hitherto accustomed to.

Our continent is that centre, and to it the European and the Asiatic peoples will flock in quest of new fields of profit other than the exhausted of centuries which necessity compels them to leave behind them.

All this influx of population and expenditure of trade will naturally give a gigantic impulse to Building. Hamlets will begin to spring, like mushrooms in a night; their growth will increase rapidly to villages—Cities will soon stand where the hamlet stood; and ARCHITECTURE will display its graces with a bounty worthy of the requisition made upon its capabilities.

Those of the old world who never witnessed our palpable growth, can form no idea of the rapidity with which civilization's tide flows onward here. To them all this may seem as wild imagin-

ing but, even we, shut up in cities, are astonished to hear of the progress making in the far western wilderness. Wherever the steam-horse rushes, adventurous man is sure to follow, and communities are formed as it were by instinct.

The demand for practical skill in construction, and artistic ability in design, is the necessary consequences, and, therefore, it becomes the interest of our profession to enter seriously and at once into the requirements of the case.

The question may as well be put forward now as at any other time, for, sooner or later it must force itself upon us; are we to have a special style, native to our country and its peculiarities of soil and climate, or are we to continue to import the inventions and reconstructions, the fossils and the fooleries, of other lands, dissimilar in every thing from ours? Are we ever and always to be subject to the impertinent criticisms of foreigners, who neither

know our wants nor comprehend our feelings, sedately reviewing our efforts from their own stand-point, and assuming to be judges in an art in which they are but the merest copyists themselves.

Americans are inventive in all things, apparently, but ARCHITECTURE. Can we doubt their ability even in that? No, there is but one obstacle to their progress, and that is to be found in the blind deference paid to every thing European, an unworthy cringing to the assumed authority of those no better than themselves. And what do we derive from the pitiful position our profession holds? Severity of criticism, ungenerous, illiberal, and unjust. If an occasional crumb of credit is vouchsafed to us it is done in such a patronizing manner, that we are made by it to feel more keenly our distance from the august throne from which it comes.

It is time we knew ourselves, and the urgency of rapidly growing events will force the knowledge on us.

ENGLISH CRITICS.

SINCE the days of that Revolution which found us a people, to the present day, we have been the subject of bitter criticisms to Englishmen. If we express a natural pride in our progress, it is stigmatized as boasting. If we claim ability to do any thing as well or better than others, it is deemed to be "bragging." And if we state facts which tend in any way to elevate our character as a nation, it is nothing short of lying.

It is true that our acrid critics sometimes give us credit, but the favor is like that of tendering a drink to the tortured that they may be enlivened enough to bear still more of persecution.

In looking over the third volume of an English book, called "*A History of Architecture in all Countries*," by James

Fergusson, F. R. S., M. R. A. S., Fellow Royal Institute of British Architects," we found at page 436, under a heading, in small caps, of NORTH AMERICA, that this man of many letters had taken us in hand. He says: "From the time of the earliest colonization of this country, till after the termination of the war of 1812-14, there was not one single building erected in Northern America, which is worthy of being mentioned as an example of Architectural Art." Very true this, for during by far the greater portion of the time mentioned we were under the most liberal and enlightened rule of England, and too much occupied with paying taxes, to provide the buildings she was too penurious to aid us to. And when we had, under the providence of a merciful God, shaken her off, we

were too shorn by her to have anything wherewith to venture on "Architectural Art."

But, hear this liberal professor:—"When, after the termination of that war, it became the manifest destiny of the United States to surpass all the nations of the earth in Art, as in everything else, they set about doing something to justify the boast they were so fond of proclaiming. Hitherto, their attempts have been less successful than even those of the mother-country:" (mark the modesty), "and there is with them less prospect of improvement than with us. An American has a great deal too much to do, and is always in too great a hurry to do it, ever to submit to the long patient study and discipline requisite to master any one style of Architecture perfectly. Still less is he likely to submit to that amount of self-negation, which is indispensable, if a man would attempt to be original. Why should he stop to design each detail to the place it is intended to occupy? Why should he try to proportion every part harmoniously, or to apply each ornament appropriately? Why submit to all this drudgery, when classic pillars and Gothic pinnacles stuck on *ad libitum*, get over all difficulties, and satisfy himself and his employers? The perfection of Art in an American's eyes would be attained by the invention of a self-acting machine, which should produce plans of cities and designs for Gothic churches or classic municipal buildings, at so much per foot super, and so save all further trouble or thought."

Let us here ask this seathing critic, how much modern England has derived from trouble and thought in the Architectural line? Is there a building in that "great wen," called London, that even an English Architect would venture to call perfect?

But we wish to quote this professor still further. Hear him—"The planning of cities has in America been always practically performed by these means;

the process being to take a sheet of machine-ruled paper, and, determining the scale that is to be used, to divide the whole into equal squares, easily staked out, and the contents of which are easily computed. Whether the ground is flat or undulating—whether the river or shore on which it is situated is straight or curved—whatever the accident of the situation, or the convenience of traffic—this simple plan enables any man to lay out a city in a morning; and if he can do this, why should he spend weeks or months in carefully contouring the ground? Why proportion his streets to the traffic they are intended to convey? Why draw complicated curves so difficult to set out, and so puzzling to calculate? Why, in short, think, when the thing can be done without thought?"

True, O most sapient of Englishmen! there was no thought spent on the majority of English towns of hundreds of years formation; or, if there was, what must the value of that thought be? For, if crooked narrowness of streets and dark lanes and blind alleys be the national idea of what constitute a desirable city or town, we cannot suppose their surveyors or Architects ever bestowed a thought upon their plan since the days of King Lud, or the apocryphal Arthur.

But, let the elegant and erudite Professor James Fergusson proceed. He says:—"It is in vain to urge that by this process the most prosaic ugliness has been stamped on every city of the Union hitherto laid out, when by a little pains and a little more thought, far more beautiful and more convenient cities might have been produced. This may be true; but the first process answers all the purposes of a *people who have so little feeling for Art that they do not perceive its deformity.*"

We cannot help italicizing this last piece of wholesale rudeness and insolence, it is so worthy of the national source from which its venom exudes, and it so perfectly exhibits that characteris-

tic dictation which is so well known and understood in every nation, where the intolerant beings of the consequential little isle intrude their dignity.

This specimen we are now noting, this F. R. S. and M. R. A. S. and Fellow of the Royal Institute of British Architects continues: "The same system prevails in their buildings."

What system?

"If not so absolutely mechanical as their plans, it is still true that their principal drawing instrument is a pair of scissors; and a machine might guide these almost as well as a human hand, were it not that after being pinned together, the design must generally be attenuated and paired down to suit the pecuniary exigencies of the case."

It is not a pleasant task to have to read and transcribe such gross nonsense as the foregoing, but we have determined to hold it up as a lesson to those of our profession who are ever most disgustingly sneaking after everything English, and trying to slime out a copy of it.

Here is one of the leading authorities amongst the royally instituted wisdom blocks of England, who claims to know more than other men, and means to make it known. Here is the redoubtable Mr. Fergusson, himself; (not the one of whom Dickens spoke,) the all-observant Mr. Fergusson—Professor Fergusson. The man with the literary tail, and whose ears are naturally longer than those of his class. How dare Americans presume to build cities uncontrolled by the royal dictates of the grandmother country? What have climate, manners, and customs, to say to it? Build as Uncle Fozzle built, and do no thinking of your own. You don't know how to think; it is no part of your "system." You are still a colony in this matter, and have neither declared your independence, nor shown any desire to do so. Buy English books, such as this before us, if you want to know anything of yourselves and your thoughtless inability.

When the all-seeing Professor visited this country, (if he really ever visited it,) the capitol at Washington was in a very unfinished state as regarded its extension, but nevertheless the contemptuous eye of that architect Argus was upon it, and thus he descanteth:

"The principal edifice in the United States of America, or, at least, the one of which they are most vain, is the Capitol at Washington, which would be a respectable building anywhere, though scarcely deserving all the praise that has been bestowed upon it."

The delicate little sarcasm "most vain" from the most vanity-stricken fossil monger of modern times, is a neat thing in its way.

Of course we will not take any notice of his detailed criticism of a building he only partly saw, any more than to say that its great merit consists in its most astounding impertinence.

Of the Smithsonian Institute he says, that it is "another edifice of which the inhabitants of Washington are as proud as they are of their Capitol, though it differs from that building as much as any one can differ from another—rude, irregular. Mediævalism being here thought the perfection of art, instead of the elegant classical formality of the Capitol." After a very slight sketch of its plan, the learned pundit says: "The style is Norman, though of a class that would have astonished a baron or a bishop of the eleventh or twelfth centuries, and resembles one of their buildings as much as the Pavilion at Brighton resembles the tomb of Muckdoom Shah Dowlut, from which it is said to be copied." Indeed!

Of the Treasury Building, the Professor says little, but that little is harsh enough. He leans a little to it when he says: "It is, however, far more appropriate to a city designed after the fashion of a *chess-board*, than such an irregular building as the Smithsonian Institute.

We wonder what plan of chess-board the Professor patronizes. The plan of Washington is different from all chess-boards we have seen.

But lo! the lion approaches our own city, and roars thus: "Another educational institution of which the Americans are equally proud, is the Girard College, Philadelphia. It is designed on principles so totally different, that either the word architecture has a thousand meanings, or those who built this do not understand the term. In this instance, instead of florid Norman, the exterior is that of a Roman temple, two hundred and eighteen feet long, but with the rather disproportionate excess of width of one hundred and fifty feet. The columns are six feet in diameter, and fifty-five in height. Being of marble, it would really be a very fair kind of Walhalla, were it not that where the cella ought to have been, we have instead, a very ordinary, common-placed two-storied college building, enclosed in this cage of pillars." How sarcastic is the Professor! Speaking of the capitol at Columbus, Ohio: "This time," he says, "the order is Doric, and the design—or outline at least—as severe as could be desired; but the usual two stories of windows, the chimneys, and other appendages which will not be hid, betray the fact that we are not looking at a temple, but a secular building of modern date, which its architect squeezed into this mould in order to save himself trouble, and the necessity of thinking.

"Most of the old capitols have not the same pretensions as this one, and escape criticism accordingly; but wherever ornament is employed, it is badly executed by the hands of amateurs, and in a country where the necessary means did not exist for even architects—if they had existed—to study and inform themselves correctly as to what was really the right and proper course to pursue."

Well, we can only say that, with all our shortcomings, our capitol buildings

are of convenient size, and the several State legislatures throughout the land have ample room for their members. Now, how is it with that mammoth palace of Westminster, so tricked out and bedizened, at the expense of millions, to a half-starving nation? How is it that the magnificent hall, finished so permanently, and devoted to the use of the "House of Commons" but a few years ago, should be deemed altogether too small and inconvenient now? Has the legislative wisdom of England so greatly expanded as to have outgrown the utmost bounds of the architect's foresight, and compelled still another expenditure on this palace of fancy? Really, it looks as if there were faults to be found at home, without crossing over here to look for them. For such as our State capitols are, they suit us. And when their designs shall become distasteful to us, it will be something that our people will then have increased in numbers, taste, and wealth, and will feel able and willing to erect newer and better State buildings.

Low down as our critic has placed us in the secular department of architecture, this keen Professor has extinguished us in the ecclesiastical line.

"The Americans," he says, "have probably been less successful in their churches than in their secular buildings; and, considering how little ecclesiastical establishments enter into their system as compared with civil government, this is not to be wondered at."

Of course not. Religious pride can only be allied to royalty. There is no Church and State Siamese twinning in this Republic, and we are spared the disagreeable necessity for "disestablishment," for our Government does not presume to control men's consciences, but leaves them to build their places of worship as they please, and make their tenets as they will. Therefore, our ecclesiastical designs are made to suit the many different congregations who have to pay for them, and who care very

little whether their style suits the spiritual aspirations of the restless Professor, or the ready eye-glasses of his countrymen.

As a finishing stroke to our presumptuous effort at building, he affects to believe the fanatic structures of the Mormons to be part of our national style in Ecclesiastical Architecture, and remarks:—"Though intended internally to be only one hall, externally they (that at Nauvoo and that at Utah) were four or five stories in height, and resembled the Town Hall, at Lourain, more than any other building in Europe; but to make the resemblance at all complete, it is necessary to realize the Belgian example carried out in plaster in the details of the Strawberry Hill style of Gothic, and with every solecism which ignorance of the style and vulgarity of feeling can introduce into a design."

Brigham Young can answer for these things, and no doubt with quite as much force and polish as the Professor has put forth.

"There is nothing," adds the acrimonious Professor, "in Europe so bad in an architectural point of view as these temples would have been; but, on a smaller scale, many of the American churches are nearly as inartistic, though, from their less pretentious dimensions, they are not so offensive."

Let us close here. We are used up. Our captious commentator leaves us not one sorry foot to stand upon.

But, in sober seriousness, why is it that phillipics like those we have quoted, should be given to the world in the pages of a book? Were they the vapid emanations of a transient newspaper, we might not dwell upon, or even notice their gaul. But here they are in the permanent form of a work which aims to be a standard of reference, to be read by this and its succeeding generations. Without one palliative sentence giving credit at least for the youth of our Republic—the inexperience of our architects—or the want of fitting models to

copy from. No! We are viewed and reviewed in that bitter, scornful tone, which spite and jealousy are always ready to assume in little, mean, ungenerous minds. Well, let the rat go bye!

INSTRUMENT TO MEASURE HEIGHTS.—Mr. Stanley, of Holborn, London, is now making a very compact and useful instrument, called the Apomecometer, that can be carried in the waistcoat pocket, for ascertaining the vertical heights of towers, spires and other buildings. It cannot be better explained, says *The Builder*, than by quoting the description given by Mr. Millar, the inventor. "The Apomecometer is constructed in accordance with the principles which govern the sextant, viz., as the angles of incidence and reflection are always equal, the rays of an object being thrown on the plane of one mirror are from that reflected to the plane of another mirror, thereby making both extremes of the vertical height coincide exactly at the same point on the horizon glass; so that, by measuring the base line, we obtain a result equal to the altitude." The instrument we have tried, testing several heights up to fifty feet, worked very accurately. We consider it to be a valuable acquisition for the architect, traveller and sketcher. A small hinged handle might be added with advantage.

A BRASS POLISH.—Rub some bichromate of potassa, fine, pour over it about twice the bulk of sulphuric acid, and mix this with an equal quantity of water. The dirtiest brass is cleaned in a trice. Wash immediately in plenty of water, wipe it, and rub perfectly dry, and polish with powdered rottenstone. So recommends the *Druggist's Circular*.

A BRIEF SKETCH OF VISTA DRIVE IN FAIRMOUNT PARK.

BY THE CHIEF ENGINEER.

THE Vista Drive is designed to lead to the western and northern borders of the west Park, by a route which gives access to many groves of noble trees, and numerous points of view along the crest of the river bluffs, and the borders of several intersecting valleys.

It begins at Girard avenue, directly at the west end of the river bridge, where it enters Eaglesfield grove, comprising many fine trees of centuries' growth. Descending through this grove it crosses Mantua run, beneath the viaduct of the Junction Railroad, and thence rises to the heights of Sweet Brier. Here it passes through a second grove of ancient trees, and after crossing an open plateau, from the margin of which opens a fine river view, it reaches Sweet Brier Vale, a deep and densely shaded ravine, in which a series of winding footwalks and bridle-paths lead to fine springs of cool water, some of which are collected in a stone basin for refreshment of visitors. An adjacent drinking pool for horses, and rustic horse-blocks for dismounting, afford like opportunities for riders and their horses. The footwalks are conducted over rustic bridges, and broad flights of rustic stairs to points where are brought in view the natural cascades and bright pools of the rapid stream which courses through the depths of this ravine. The Drive continues along the southern edge of Sweet Brier Vale, nearly to its head, and there crosses on a causeway supported on a culvert of substantial masonry, and skirting the northern bank of the ravine, reaches a river bluff, where a short branch leads to a concourse that overlooks the river, and gives extensive views both north and south. Upon this bluff, as well as on the verge of the plateau just passed, south of Sweet Brier

Vale, rustic summer-houses are to be erected at the best points of view.

The Drive next crosses the Falls road, upon a rustic bridge of twenty-five feet span, and commences the descent into Landsdowne Valley, presenting in its course numerous and varied views of river and upland scenery. By a gradual descent along the southern border of the valley, the Drive winds among many giants of the forest, tulip trees, and chestnuts, and oaks, and hickories, and passes near a dense cluster of the curious Angelica tree, or Hercules' club.

It next crosses Landsdowne run, on a rustic bridge, alongside of which is a natural basin, where the waters of the run are gathered into a miniature lake, bordered with ferns and aquatic plants. On the ground now reached, on the north bank of the valley, was once located the grand avenue of entrance to the old Penn Mansion, long since destroyed by fire. Along the course of this ancient avenue, the former beauty of which is attested by the relics of its assemblage of pines, and oaks, and chestnuts, may yet be seen a few survivors in a flourishing condition, showing grand stems of twenty feet girth, surmounted by spreading branches shading a thousand yards of area, while some giant skeletons of pines spread their bare arms as if defying the storms of a hundred winters.

Landsdowne Valley is remarkable for numerous springs of delicious water, soft and cool. No less than fifteen of these springs are found within a distance of half a mile. Footpaths wind along the slopes of the valley, some leading to nooks and dells watered by these springs, and others climb in zig-zag reaches by short routes from the bed of the waters to the summit of the adjacent heights.

Upon this summit, at its projecting

angle, is Landsdowne Concourse, a level space, covering several thousand square feet, on which carriages may tarry while the visitors saunter through the various walks, or catch the reflection of the landscape on the long reaches of the river, that may be enjoyed from spots where rustic arbors are to be placed.

Passing along Landsdowne Ledge, the Drive reveals continually changing views of the lake-like surface of the river, bounded by bold cliffs that are clothed with verdure from the water to the sky.

At the northern terminus of the Ledge, it bends westward along the southern edge of Belmont Valley. At the point of turning, may be seen a remarkable group of chestnut sprouts standing around the fire-eaten shell of their parent tree, which is thirty feet in girth.

Near at hand are several other chestnut trees of immense size, probably the offspring of the giant relic. A circular concourse under the shadow of these trees, and surrounded by a score of the same species of various ages, is named "Chestnut Ring." A short distance west of this spot stand some noble Oaks, remarkable for symmetry and vigor, which suggest the name of Druid Way for the locality. At this point converge all the footwalks that have been winding along the shaded slopes from Landsdowne Valley and from the river shore, some passing over rugged heights along a precipitous ledge guarded by a railing, and others meandering along the borders of Belmont Run. Rustic seats are placed along Druid Way for repose of pedestrians who may here join their carriages on the adjacent Drive, or rest before going afoot to the summit of George's Hill, a half mile farther west.

The concourse on George's Hill is the destination and present terminus of the Drive and paths now under construction. When these are completed the work is to be continued as ordered by the Board of Commissioners until it

reaches Belmont and Ridgeland and Chamouni, revealing scenery that may become the subject of a future sketch.

Pausing for the present on George's Hill, the gaze of the visitor is directed southward and eastward upon a wide panorama embracing more than one-fourth of the horizon. In the distance the view takes in the forests of New Jersey and the waters of the Delaware.

In the middle ground lies the city, with its crowded chimneys and its many spires and domes. While at the feet, almost, of the observer is a broad plain, covered with verdure and with various crops of farm and garden culture; and rural buildings stand in the midst of these surroundings in the quiet repose of country life. The length of drive laid out for completion this season is about six miles, and the return from its extremity may be by the more direct course of the river road, now in use, making a continuous circuit of nine miles; or by retracing the Vista Drive, giving a ride of twelve miles. The width of the Drive is generally about two rods, or over thirty feet, widened sometimes to fifty feet, and on the concourses to one hundred and two hundred feet, and narrowed to twenty-five feet for short distances at a few points where the full width would destroy valuable trees.

The walks and paths now opened are about five miles in extent, and of various widths ranging from six to nine feet, the greater portion being eight feet wide. These walks are to be extended during this season to twice their present length.

The surfaces of these roads are as yet of the natural soil, which may possibly be kept smooth and dry by careful surface drainage during the summer; but the frosts of winter and the thawing out in spring would destroy this pleasant surface, making it needful to give the more costly and less elastic surface of broken stone, which is to be applied before next winter.

To provide convenient access to these walks for the great body of citizens who



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IRON STORE-FRONTS, No. VI.

By WM. J. FRYER, JR., WITH MESSRS. J. J. JACKSON & BROS., NEW YORK.

do not come in their own conveyances and for whose recreation the Park is largely designed, a commodious landing for steam boats and small craft is to be established on the west shore of the river near Columbia Bridge.

From the vicinity of this landing the walks diverge to Belmont and Landsdowne and George's Hill.

Besides this agreeable approach by water the Park is reached at its most remote angles by short walks from street passenger lines. On the west one line passes Forty-first street a few blocks south of the southern border, and another approaches still nearer to its western angle at Fifty-second street. And the Reading accommodation lines take passengers close to its northern angles at the Falls of Schuylkill. On the eastern border the lines of approach are numerous. No less than five lines

pass directly to the various gates along this boundary.

NOTE:—It will be observed that some portions of the Drive are as yet only roughly graded so as to allow carriages to pass. The frequent rains since June 1st have retarded the completion at these points. They are to be sloped and planted in the same style as the parts now finished, and it is hoped will be completed during the present month. The grading of the remainder of the Drive to the northern border of the Park will then be put in hand and will probably be finished in September, when the force employed must be discharged, unless means are provided for improving the River road and the East Park, the work on which would keep the force employed through the autumn and winter.

FAIRMOUNT PARK, *Phila.*, June 15, 1869.

CONCRETE BUILDINGS.

THE increased cost of building materials has of late led to renewed and extensive experiments with concrete. This material has in various forms been employed for ages, and is said by travelers to be found hard and undissolved after 3,000 years of exposure among the temple ruins of Nineveh.

This concrete was in all probability composed simply of a lime mortar, tempered by treading with the naked feet of the laborers until it became tough and homogenous, and then mixed with broken stone or rubble.

Many attempts have been made in this country to use a material of this character in the construction of buildings, but owing to the slight degree to which the management of the material in large masses has hitherto been understood, it has in many instances cost quite as much as brick; the comparative slowness with which the water is eliminated renders the wall liable in our northern climate, to be suddenly disin-

tegrated by frost. Because concrete has answered well in foundations, the conclusion has been too hastily arrived at that it would therefore be equally suitable for houses. The duty it has to perform in the former case is to transmit the superincumbent pressure to the ground; and the only resistance that the material is called upon to display is that against crushing. To secure rigidity and stability in unsupported walls requires peculiar care and knowledge in selecting and compounding the materials. All artificial monolithic masses labor theoretically under the common disadvantage of their soundness being in the inverse ratio of their size. Not only is this true for artificial, but also for natural substances. These facts have led to the disuse of concrete for binding rubble into the form of walls, and the adoption of building blocks, which are made of such size that one man may readily handle them, and which are simply bricks of concrete. This

system also allows of the introduction of "bond," which does not, strictly speaking, exist in the rival principles, and there is, therefore, the absolute necessity for introducing binders and joists as soon as possible in their case. The composition of these blocks differs from that of the ruder concrete in the addition of hydraulic or Roman cement, by which their hardening is much facilitated. The blocks are formed in wooden moulds, and require in their manufacture only a moderate degree of skill, the material being made by combining, in a wet condition, the caustic lime, cement, and sharp sand in about the proportion of one bushel of lime, six of sand, and four quarts of cement. The blocks require considerable time to harden solidly throughout, and should be kept under shelter. Some manufacturers facilitate the manufacture, and also the hardening, by mixing the ingredients by machinery, by means of which steam and hot water are injected into the plastic mass while mixing.

Recent experiments by a German investigator seem to show that the costly hydraulic cement may be dispensed with when the blocks are not placed under water, by employing a kind of mortar made of slacked lime and finely sifted sand. Caustic lime, equal to one-quarter of the sand used, is mixed with the mortar when required for use; the heat resulting from its addition induces the formation of silicates, which quickly harden the mortar.

It has been suggested that, inasmuch as the hydraulic cement heretofore so largely employed, owes its efficacy to the silicate of alumina contained therein, an artificial cement may be made for the purpose by properly mixing lime with twenty per cent. of dry clay.

A modification of the "block" system is the slab system. The difficulties attendant upon it appear to be principally the impossibility of ensuring the perpendicularity of the upright portions of the house, the squareness of the angles, or the sharpness of the arrises. The

idea of attempting to raise walls twenty feet and thirty feet in height by means of small angle iron uprights and slabs of concrete from three to four inches in thickness, is a simple absurdity. The house consists of nothing but panneling, and one is puzzled to decide whether one is really inside or outside, as the walls appear to have literally no consistency or solidity.

For facilitating the construction of solid concrete buildings, a Mr. Drake has taken a patent in England for the use of flanged iron plates, supported by iron uprights secured against the face of the wall, such plates to be shifted upwards step by step upon the uprights, and locked to them in the several positions by pins. He also claims angle-plates, to form the angles of walls; also the use, to connect the front and back plates and uprights, of metal straps, with pin holes in them at various distances, so that the length may be adjusted to the thickness required.

Several extensive structures are now erecting in England by the solid method; among them a large warehouse in London, 70 feet by 60 feet by 50 feet, which will no doubt prove a success, because the work is carried on under the superintendence of those who thoroughly understand the subject, both theoretically and practically. The Duke of Northumberland is constructing a solid cottage of Portland cement concrete. The foundation, set on sand, is six inches thick and eighteen inches wide; the walls are nine inches in thickness and two stories in height. The roofs are all flat, and are constructed entirely of concrete and old wire rope. The ceilings are divided into panels by ribs at right angles, and require no plastering. A wall on the upper floor is supported on a concrete beam, thirteen feet span; a large cistern is formed under the roof, its sides being the walls of a room. This will severely test the impermeability of the material. No wood is used except for doors, and no iron except the old wire rope — *Van Nostrand's Magazine*.



ST ANDREW'S LUTHERAN CHURCH,
CORNER OF BROAD AND ARCH STREETS, PHILADELPHIA

DESCRIPTIONS.

IRON FRONTS. No. 6.

By WM. J. FRYER, JR., NEW YORK.

THIS design closes the present contributions of Mr. FRYER on the construction of iron fronts, as applied to street Architecture. We leave every one to judge of the advantage to be gained by the liberal use of the material in question, in reference to artistic effect, or economy of execution. There is a very strong prejudice existing amongst some Architects against the artistic use of iron in fronts intended to be architectural, and we believe that all will agree that without reference to expense, the use of cut stone can never be superseded by cast iron; the one being a reality, the other a fiction which must have the aid of paint and sand to give it the semblance it seeks. Yet, granting this, the iron still has the before-mentioned advantage (and, in a worldly sense, it is an overwhelming one) of economy—presenting a similar appearance for a mere moiety of the outlay. Shams in building are of such very common occurrence as to almost cease to be a disgrace, and many people lean to the opinion that a stone-fronted brick house is as much a sham as an iron front. The one would make the observer believe that the whole house was stone, when it was in reality but burnt clay. The other that the front was stone when it was simply iron. Now which is the greater sham—that of the whole house, or of the mere front?

The truth is we are blind to many glaring inconsistencies, whilst we think we have our eyes fully open to the whole truth. A cornice is really intended to indicate the projection of the roof of a building. Now, let us ask, how often in street architecture does it form a

part of that great feature? Do we not see this sham protruding quite palpably everywhere we turn? Why, then, be so set against a useful material, because it only represents another, whilst we persist in overhanging our stone-veneered fronts with gaudy, giddy cornices that threaten destruction to our heads, and would more than threaten were it not for the good offices of iron, which, in suitable forms, restrains the impending evil.

We thank Mr. FRYER for his contributions, and will always be glad to renew the kindly acquaintance which has for the past six months given pleasure to our readers as well as to ourselves.

ST. ANDREW'S LUTHERAN CHURCH.

THIS fresh edition to our ecclesiastical architecture in Philadelphia, occupies the southwest corner of Broad and Arch streets. The structure, which is now in course of erection, will be fifty-four feet front, and one hundred and ten feet deep. It will be in two stories; the first or basement will have its floor elevated four steps, or two and a half feet, above the pavement, being fourteen feet from floor to floor. The Audience Room will be twenty feet high at the sides and forty feet to the apex of ceiling from the floor. A cellar, seven feet high, extends under the entire church.

The fronts, facing respectively Broad and Arch streets, will be finished with stone laid "broken range work," finished off to an even surface. The facing stone will be of blue marble with Ohio stone dressings. The door sills, plat-forms and steps will be all of rubbed blue stone.

The interior will be finished up commensurately with the style of the exterior, having a gallery, of horse-shoe shape, across the front and over the vestibule, to which two flights of stairs will lead from the latter.

The roof will be covered with slate of various colors and forms, and the ridge will be decorated with cast iron ornamental combings.

The design, as will be seen, is Gothic, semi-decorated, and the object kept in view the unity of effect in the inclination of the terminal parts to a general culmination.

The furnishing and interior finish of St. Andrew's Lutheran Church will be such as to make it equal in all respects to the other Churches of the same size which are to be found so liberally scattered throughout our city, adding conspicuously to our Philadelphia street Architecture.

DOUBLE SUBURBAN VILLA.

HERE, in what may be denominated as the Franco-Italian style, we have a design for a double villa, or two fashionable suburban residences under one roof, although broken so as to give an apparently independent roof to each.

With a twelve-inch party wall, these houses are each as distinct from the other internally, as though they were apart. No sound is transmittible from the one to the other, and the hall door entrances being at the extreme ends of the combined building, as well as being set back from the front, tends to make the independence of each the more complete and satisfactory.

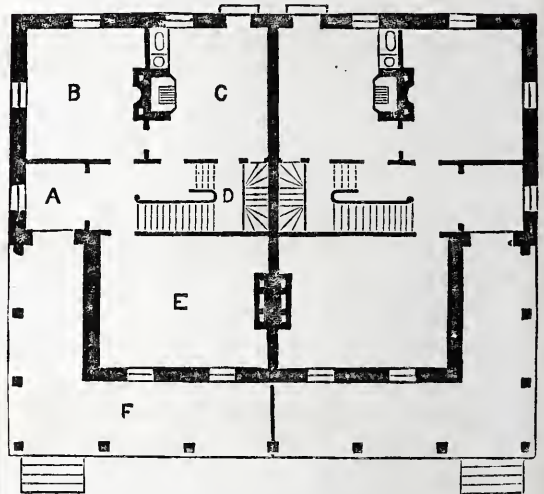
The Mansard Roof here serves an excellent purpose, giving a third story without undue increase of height, and adding materially to the appearance and comfort of the whole.

Executed in pressed brick, with stone quoins, and having terra-cotta trimmings,—or, built of rubble with hammered-stone quoins and cut-stone trim-

mings, the effect of such a composition would be pleasing. Much could be added by enriched treatment of the roof, covered with ornamental slating and handsomely kerbed, having a florid iron balustrading on it.

This mode of constructing two houses in one is not as much employed in the suburbs of many of our cities as it might be, and it is time that its very great advantages should become widely known. In the first place, it presents an imposing appearance, such as the two houses, independent of each other, could not. In the next place, its economy of construction is evident. And finally, the comfort acquired by mutual shelter is most desirable. What more can be required?

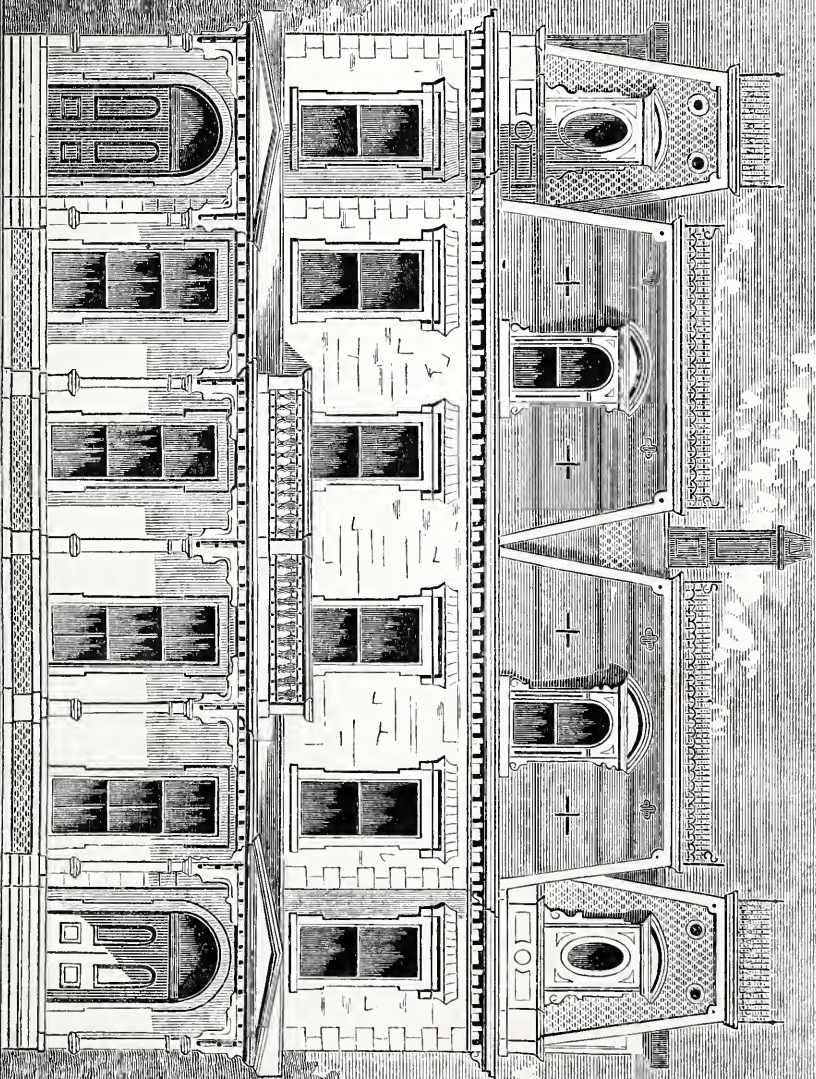
The internal arrangement is as here shown.



A, Vestibule; B, Dining-room; C, Kitchen; D, Passage, off of which is the stairs descending to cellars, and also a pantry under principal stairs; E, Parlor; F, Veranda.

The Laundry, Dairy, and Fuel closets are in the cellar story. The second story is in accordance with the divisions of the first story, and has three chambers, a bath-room over vestibule, and a family clothes closet off of the landing.

The Attic gives a similar arrangement with diminished area of rooms, owing to the contraction of the roof.



DOUBLE SUBURBAN VILLA.



S W I S S R E S I D E N C E .

THE design which forms the accompanying illustration is one of those efforts to appropriate to our suburban architecture one of those styles prevailing in that part of Europe where overwhelming avalanches call for roofs of unusual projection to fend off the sliding snow, and brackets of appropriate proportions to sustain such roofs. Having no such dread visitants to provide against in our climate, and desirous, nevertheless, of borrowing this interesting style, we adopt its features and adapt them to our own tastes and requirements. We do not need the excessive projection of roof, or the galleries surrounding stories, so we retain only that which is simply needed. The ornamentation too is more suited to our wants, and the modernizing of the entrance door and windows, together with the reduction of the usual gallery to a covered balcony, tend to utilize the Swiss in an American sense.

The framing of the walls gives an appearance of strength in the diagonally braced sections, and if the timbers showing display be neatly stop-checked, the effect thus produced must be very pleasing.

As shown, the walls are clap-boarded, but ornamental shingling can be substituted if preferred.

Between the studding, it would be well to fill in with *brick nogging*, either dry or slightly mortar-jointed. This will tend to make the walls warm. Provided the wood-work is clear and unblemished, oiling would be better than painting; and, if economy were not a subject for consideration, we would urge the superiority of silicate of soda (soluble glass) as an advantageous coating for the exterior. That material will preserve the tone of the surface without darkening, and will likewise tend to

render the otherwise inflammable material at least partially fire-proof.

The plan or arrangement of floors is calculated for comfort rather than luxury, and the central location of the chimneys concentrates the heat so as to make this residence comfortable in winter. Whilst the location of the windows gives ample light and ventilation to the whole the year round.

Entering at the hall-door we find the plan to be as follows: A, Vestibule. B, Hall and staircase. C, Parlor with bay window. D, Dining-room with two closets. E, Kitchen with stoop and steps leading to yard; also, stairs, leading to servants' sleeping rooms.

On the second story, we have F, small Bedroom. G, Chamber, with roofed balcony on front, and open balcony over bay window on side; also, two closets. G, Rear Chamber, with two closets. G, Servants' sleeping room.

It will be observed that the fashion, so much followed in our day, of throwing the parlors into one, by the use of sliding-doors, is in this plan different in that respect, owing to the central position given to the chimney. It will likewise be seen that, adopting the sliding-door system would cause our plan much inconvenience, on account of that very feature. Internally and externally it would be a source of dissatisfaction. We have, therefore, concluded to embrace the more comfortable alternative, and confine our parlor accommodation to the front room, which with the bay-window addition, is in fair proportion with the required capacity of such a class of house.

The chamber floor is divided up so as to give convenient sleeping apartments, together with all the desirable accompaniment of closet-room, which goes so far towards rendering a house comfortable and adding to its intrinsic value.

As concerns the style in which this suburban house is designed we will add a few remarks.

The Swiss style is eminently adapted to this country, owing to the fact of our staple material, in the great majority of the States of the Union, used for house building being wood. There is no other style which accords so completely with the very nature of that material as it does. In fact the Swiss style could not very well be carried out in any other.

It is evident, then, that as a most characteristic material to meet all the peculiarities of that unique style, wood is what is required, and wood is what we possess in vast abundance.

For picturesqueness of effect of style, we need scarcely say that it is and always will be charming, whether applied in a modified form to the wants and tastes of citizens living on the outskirts of crowded cities, or as the perfectly independent rural home of the country gentleman who finds it his happiness to perch his romantic villa on some mountain side, where the far over-reaching roof with its bold deeply-carved brackets will give a marked expression to the scene, and serve to draw the connection of nature and art still nearer.

Switzerland has no more appropriate sites for this, her national style, than we possess here in our Alleghanies. Mountain, rock, and waterfall are ours as well, and if our scenic artists would but seek them out, as noble landscapes exist here in America, as are to be found there in Europe.

As yet our architects have not given much attention to the Swiss style, and when they have essayed it have either, made a slavish copy, or so slighted its character as to leave a doubt as to their intention of producing anything in that line.

Now, we would not be set down as counselling the transfer of Swiss rural architecture in its rudeness to our soil,

but we desire to be understood as anxious to see a style whose leading features are so admirably adapted to the tasteful wants of many sections of our land, introduced in a modified (not a distorted) form amongst us.

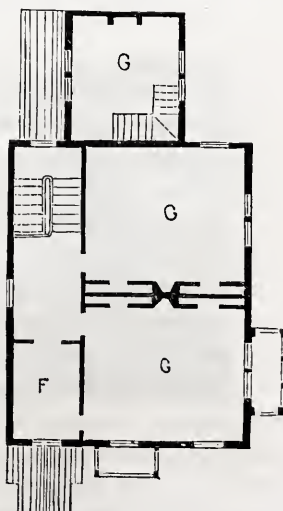
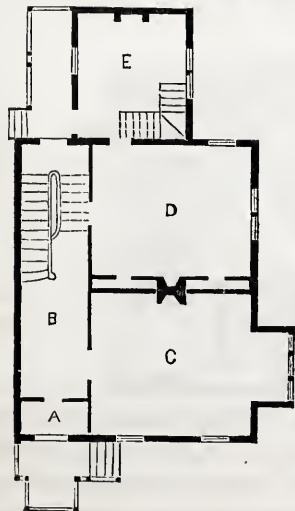
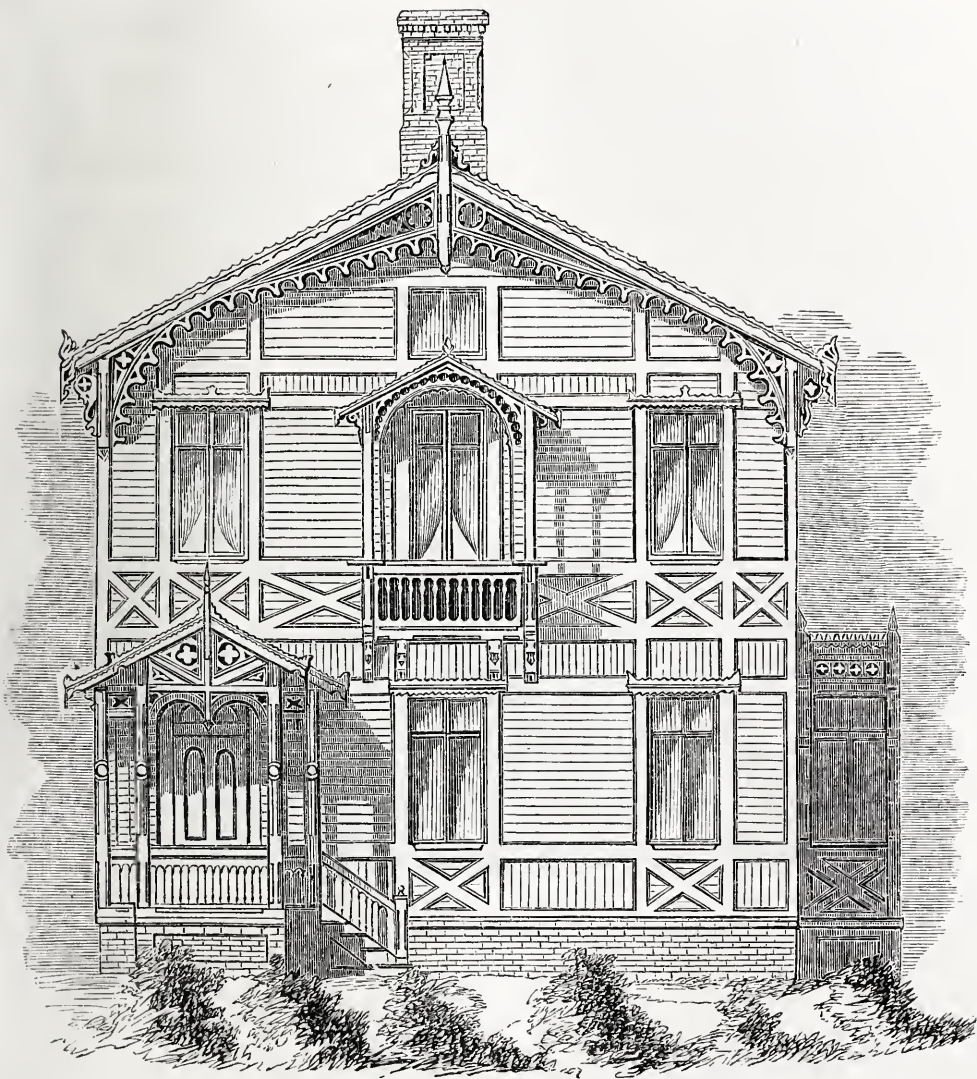
The climate of our country is as varied as its surface. In fact we possess the parallels of every climate to be found in Europe. This fact alone ought to be suggestive to our architects of the advantages they possess in appropriating the choice of style to the locality it is intended for.

FACTORIES IN MARLBORO' DISTRICT.—

The *Bennettsville Journal*, of the 6th instant, says:

"A few weeks since we noticed that several parties proposed rebuilding the old factories in our district. Since that time we are gratified to learn that contracts have been made to that effect, and that Colonel M. McRae, and Alexander McRae, Jr., Esq., of Robeson county, North Carolina, are now preparing to build a factory and mill at Red Bluff. We learn that they are to have merchant flour mills, a wool-carding mill, and a factory to make cotton thread and cloth. The little Pee Dee is ample for any machinery, and we believe that the enterprise will prove a success. The people of Marlboro' have always been noted for prosperous factories, and had it not been for the war, the factories then in existence would have been on a substantial basis to-day. But the people are recovering somewhat from this terrible drawback, and factories are being built in several portions of the district. We sincerely trust that great success will attend the undertaking.

CEMENT FOR STONE.—Mix tripoli and oxide of lead in about equal proportions; add half a part of freshly slacked lime; make the whole into a paste, with boiled linseed oil. Excellent for securing iron-work in stone.



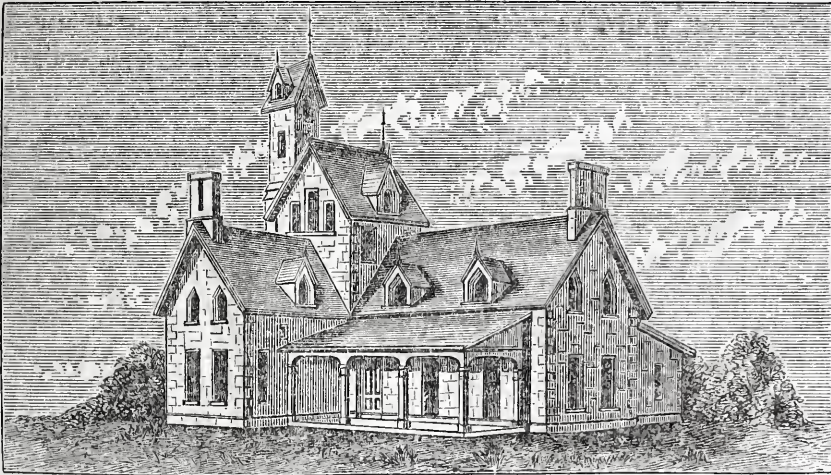
PLANS AND ELEVATION OF A SWISS RESIDENCE.



EFFECTIVENESS WITHOUT ORNAMENT.

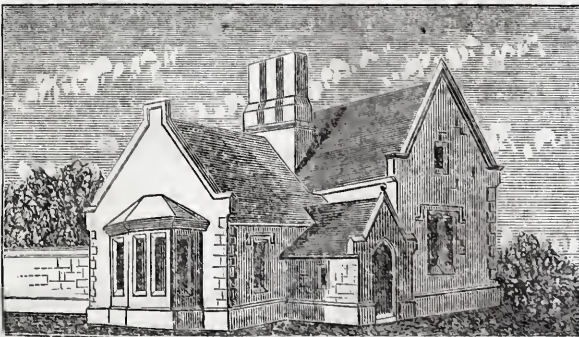
A TRULY effective design is that which secures admiration, or gives pleasure, without any effort at ostentation. This desirable effect is produced in small compositions by the breaking up of the sky-line, or the artistic irregularity of the plan. It is not limited to large constructions, for the smallest can partake of it to a comparatively very

great extent. This treatment of cottages and small villa residences in combination with picturesque shrubbery, could not fail of making our American scenery rich and beautiful. Stiffness and uniformity of front are entirely out of place in the country, and will not fail of generating a dislike which other advantages of locality cannot compensate for.



Here is a design of a cottage villa, if we may use the term, of small pretensions, yet, by the breaking up of its plan and outline it is made to possess not a little interest, which is very much enhanced by the introduction of the square tower flanking the central and

highest part of the building. Such an arrangement would not alone give a great amount of light, but of thorough ventilation also, and the projecting masses tend to flank and protect each other, and make the whole comfortable, as well as sightly.



We here give a small cottage, appropriate for a gate lodge, gardener's house, or the like, which would make a pretty feature at the entrance to cultivated grounds, and be an ornament to

the roadside. There are situations where such a cozy and permanent little dwelling might be a desirable cottage residence for a small private family of moderate income.

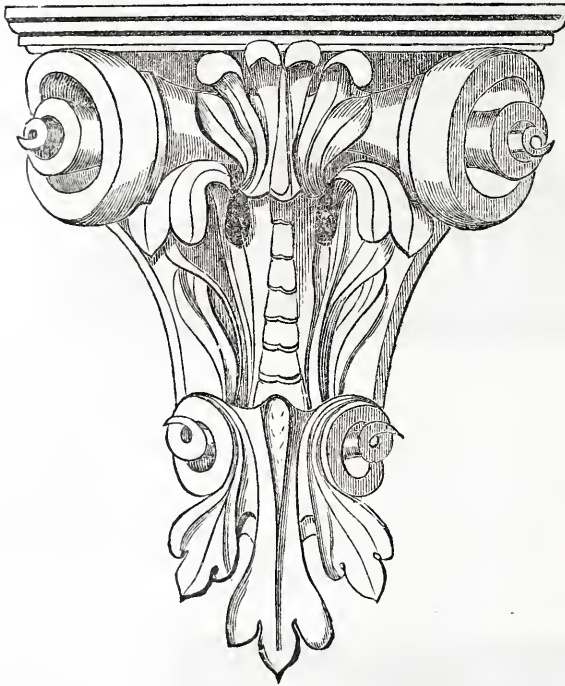
DESIGN FOR A BRACKET.

AS an accessory to interior finish there are few ornaments which require truly tasteful design more than the bracket. Whether used in hall or library it is a feature, and can make or mar by its appearance any composition however good otherwise. A graceful bracket is a beauty that will win attention; an ill-designed one, will also draw the eye to it, but with a very different result.

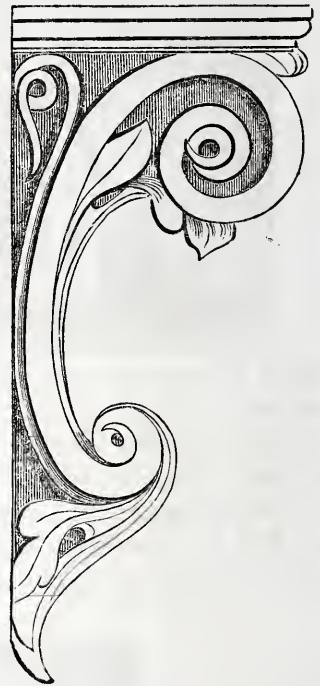
How frequently do we see a charm-

ing statuette placed upon a repulsive looking bracket of florid pretensions? In such case the bracket becomes a nuisance, mischievous to a degree, for it detracts from the graces of the gem of art it is its office to uphold.

We here present a suggestion for a floral bracket intended to sustain a basket or vase of flowers. It will also answer to bear the statuette of Flora, or an Arcadian Nymph, unity being the object aimed at.



FRONT VIEW



SIDE VIEW.

GUNPOWDER PILE-DRIVER.

IN cities, where made-ground or naturally soft and deep bottom are so frequently met with, pile-driving is a necessity, and the engine hitherto made use of for this purpose, although mechanically simple, has so retarded the operations of building by its slowness

of action and inadequacy of stroke, not to speak of the occasional falsity of its blow and consequent loosening of the pile, that any improvement on the system must be desirable. The invention now patented by our fellow citizen Mr. THOMAS SHAW, is admirably progres-

sive in this line, and we feel that we cannot do it more justice than to give in full the report of some exhaustive experiments made under the direction of Chief Engineer W. W. Wood, of the United States Navy:

Philadelphia, June 15th, 1869.

GENTLEMEN:—Having been present by invitation, at the ship-yard of John W. Lynn, Esq., of this city, on the 14th inst., to witness the working and operation of Thomas Shaw's patent hammer for driving piles by the agency of gunpowder, and requested to report the action and details of the operation, we herewith briefly state the result to have been as follows:

The pile-driving engine was of the usual form, being two vertical posts resting upon a platform, and readily moved as required.

The height of the posts was 48 feet, fitted with guides, and a frictional V-shaped rod, under the control of the operator, so arranged as to arrest the ram working in the guides, at whatever point desired.

The ram, working in the guides, was fitted with a plunger, extending through its centre and projecting above and below it about two feet.

The top of the pile was protected with a cast iron cap-piece, 30 inches deep, on the bottom of which was a recess resting upon and following it down during the process of driving it; into this cap-piece, upon its upper portion, was a cylindrical aperture, $4\frac{1}{2}$ inches in diameter and 18 inches deep, into which the lower plunger, attached to and forming a part of the ram was fitted.

At the upper portion of the frame was located a cylinder, into which the upper plunger of the ram was fitted.

The operation being, that when a pile was placed in position to be driven, and but little space afforded for striking a blow, the upper plunger entered the cylinder at the top, compressed the air, and, by its elasticity, gave additional

force to the ram in its descent upon the pile.

The hammer was put in operation by hoisting it up 6 to 8 feet, in which position it is held by the friction-bar, operated from below by a suitable lever. A cartridge is then thrown into the cylinder of the cap-piece, resting upon the top of the pile, by an attendant; when the hammer is released and falls, the plunger enters the cylinder of the cap and explodes the cartridge, which forces up the hammer a distance of from 7 to 9 feet, depending upon the size and weight of the cartridge.

The reactionary effort in projecting or throwing up the ram being utilized in forcing down the pile.

The weight of the ram, with the plungers, was 675 pounds.

The pile which we saw driven was very nearly parallel throughout its length; 12 inches in diameter, in the centre, and 32 feet long.

When placed in position, with its lower end pointed, eight blows were first given, to show the gentlemen present the operation of the machine, forcing the pile down 36 inches.

Nine (9) blows were then struck, forcing down the pile $20\frac{1}{2}$ inches. Time consumed, 15 seconds.

Next, twelve (12) blows were given, forcing down the pile $22\frac{1}{2}$ inches. Time, 15 seconds.

Seven (7) blows followed, forcing down the pile $30\frac{1}{2}$ inches.

The hammer then rested a distance of one foot above the head of the pile, at which point a blow was struck, which forced down the pile 1 inch. [Every one who has seen a pile-driver, such as is in common use, knows that with a fall of one foot only, the effect would not be perceptible, unless the driving were in very soft ground.—Ed.]

At this stage of the operation, a cartridge one-half heavier than those previously used was placed in the cylinder, and, when exploded, forced the pile down $5\frac{1}{2}$ inches, followed by two succes

sive blows, when the pile was driven $12\frac{1}{4}$ inches.

One blow, with similar cartridge, was struck, forcing down the pile $4\frac{5}{8}$ inches.

The experiment was then made by striking the pile with the ram falling the same distance, 8 feet, from which it was thrown by the cartridge, dispensing with the cartridge, when the pile was driven only $1\frac{3}{8}$ inches. The blow in this case being similar to that given by an ordinary pile-driving engine with a ram of 675 pounds falling through a distance of 8 feet.

The next blow was made similar to the last (with the use of the cartridge,) the ram falling through 9 feet 6 inches, when the pile was driven $4\frac{3}{8}$ inches, as in the former case.

A hard and well-seasoned oak block was placed upon the cap resting upon the pile, upon which the plunger fell when powder was not used.

The next experiment developed the rapidity with which the operation of driving piles with this machine could be prosecuted.

The pile was driven 10 feet 6 inches in 55 blows. Time consumed, $1\frac{1}{4}$ minutes.

Eleven (11) blows were next given, forcing down the pile $26\frac{1}{2}$ inches.

Twenty-nine (29) blows were next given in 40 seconds, driving down the pile 9 feet 2 inches.

The pile was next driven 2 feet, which completed the total distance driven, viz.: 30 feet, of which no record was kept.

On the completion of the work, the cap was lifted off the pile, when the head was found to be in as perfect a condition as if, practically, no force whatever had been applied to it in forcing it through a distance of 30 feet in stiff, hard soil. It may be proper to add, in conclusion, we consider this novel application of gunpowder to be an unqualified success, for the purpose of driving piles, promising as it does, a saving both of time and labor, which

should commend its use to all who require machines of this character.

We are, respectfully,

your obed't servants,

W. W. W. WOOD,

Chief Engineer U. S. N.

H. L. HOFF,

Eagle Iron Works, Philadelphia.

T. J. LOVEGROVE.

Inspector of Steam Boilers, Philadelphia.

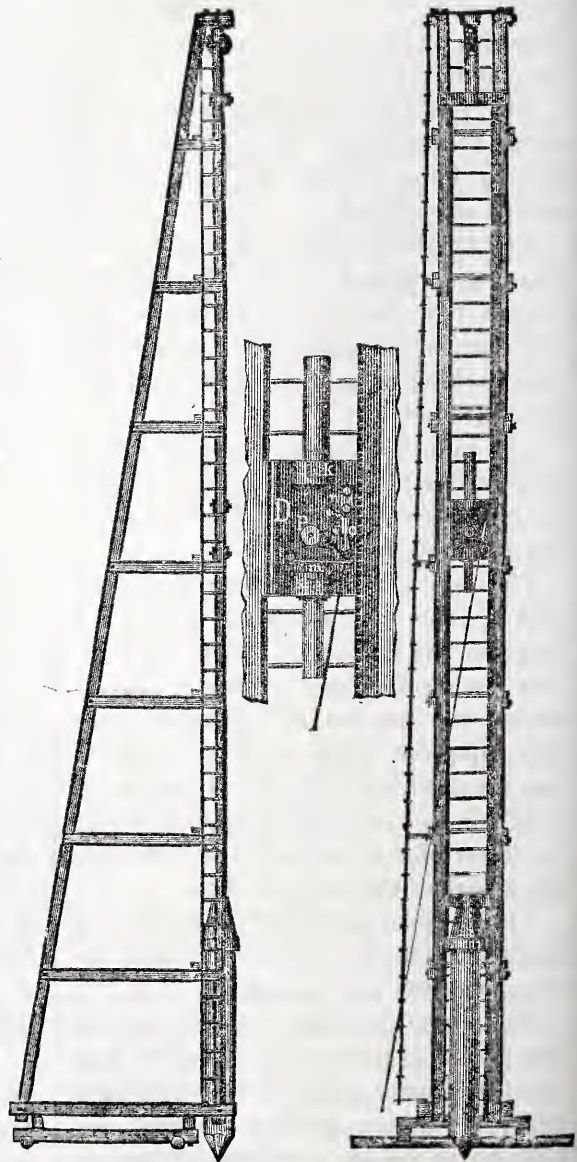
To Messrs.

THOS. SHAW,

W. H. RICHARDSON,

W. L. GILROY,

JNO. W. LYNN.



LONCAGRE & CO. PHIL^a

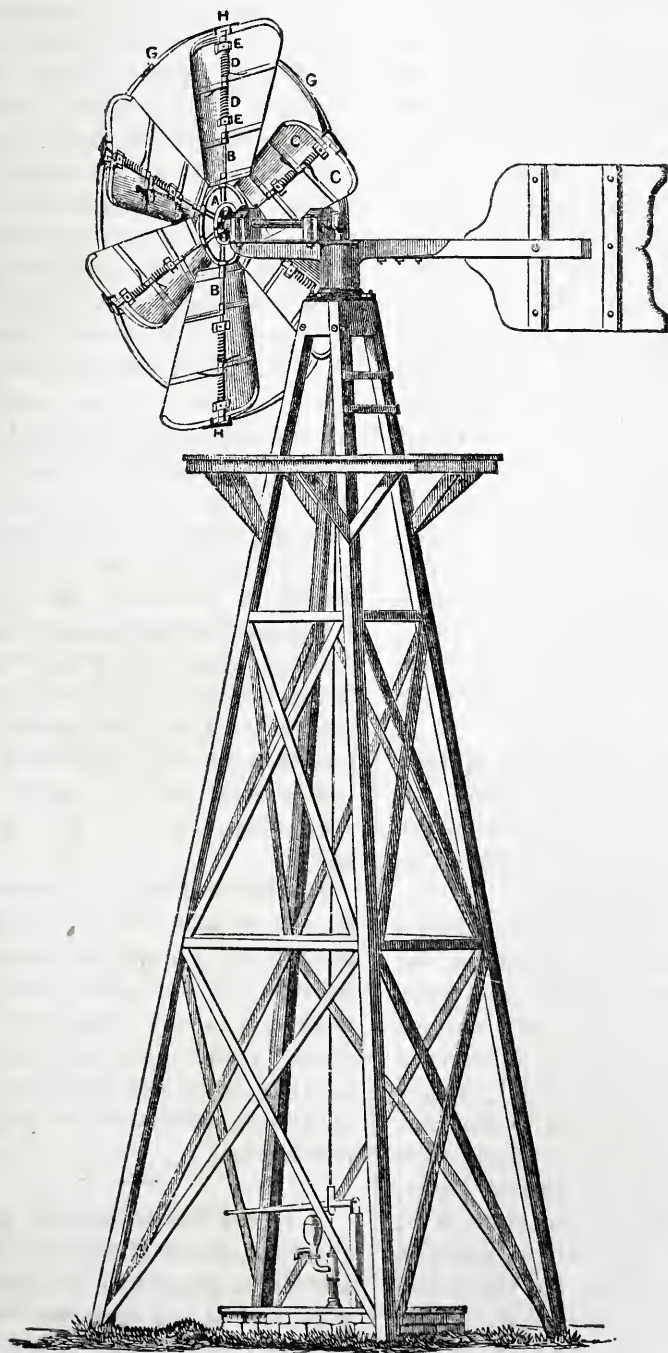
PATENT GUNPOWDER PILE-DRIVER.

DRAINING BY WIND WHEELS.

THERE are many localities which might be made eminently available for sites if drained, and an inexpensive method of effecting such a purpose is desirable.

In Holland, Wind Wheels have been made to answer well, and they are used very extensively.

The accompanying cut represents the patented invention of Mr. J. Elgar, of



ELGAR'S PATENT SELF-REGULATING WIND WHEEL.

Baltimore, of a SELF-REGULATING WIND WHEEL, simple and easy of action, and (presenting no material obstruction to storms,) not likely to be blown down.

In the absence of water power, it is the cheapest agent in the pumping of water for country houses, farms, &c.

There are three sizes made, 6 feet, 10 feet, and 15 feet.

A is the cast-iron hub or wheel, in which are inserted the arms, B, of wrought iron. G is the rim, made of flat wrought iron, and in this the outer ends of the arms are fastened. C C are two wings on each arm, B; they are made of sheet iron; for a ten-foot wheel they are four feet long, and two feet wide at the outer end. They are hung by hinges to the arms, and rest on shoulders at their inner ends, and against the collets, E, at their outer extremities. D D are the two spiral springs made of steel wire and secured as shown to each arm. One spring is made much stronger than the other, each is coiled loosely around the arm, about four inches in length, and has a tail about seven inches long, pressing against, the back of the wings. H H are stops on the rim of the wheel—one for each wing.

The collets E, to which the springs are fastened, are movable round the arms, so as to *strengthen or weaken* the force of the springs, to suit the work, and are held by a set-screw.

The object of this wheel is to afford a self-regulation, or government, in the *wheel itself*, by the combined and reciprocal action of the wind and springs upon the wings. It will be observed that there are two wings hung by hinges on their edge to each arm, B, and that they are thus independent of each other. They can revolve within certain limits, and are kept up against the stops H H, in their proper angle to the wind, in plane with each other by the coiled springs pressing on their backs. Those wings which, in the rotation of the wheel, are aft of the arms, are held up

to their work by the inner springs, D, which are so strong that they yield only in cases of high winds, to relieve the wheel from too great pressure. In common winds they are stationary, and furnish the means of a constant power to propel the wheel. Those wings forward of the arms in the revolution of the wheel are held up to their stops in light winds by the weaker outer springs, D, which yield easily when the wind grows stronger. Every degree of movement of these wings back, brings them nearer into the plane of the wheel, and thus lessens the power of the wind to produce rotation; and when they are forced *into* the plane of the wheel, their effective power is neutralized. [This result is only produced by a force of wind sufficient to propel the wheel at a proper speed by the stationary wings alone.] As the strength of the wind increases, these wings are forced back *beyond* the plane of the wheel, and then become a retarding power. And though the wheel would *stop*, when the wings fold back during a *storm*,—by the *after*-wings being made a few inches wider than the forward wings, the wheel will go on. When the wind falls or lulls, the wings are restored by the springs to their former positions. This wind wheel revolves with nearly a uniform velocity, even when the wind is very fickle or faulty.

It is believed that this mode of governing a wind-mill, is more simple and efficient than any heretofore known. From its safety in storms and steadiness of motion, it is well adapted for grinding grain, pumping water at railroad stations, farms, country seats, and also for sawing wood, to which purposes it is now applied.

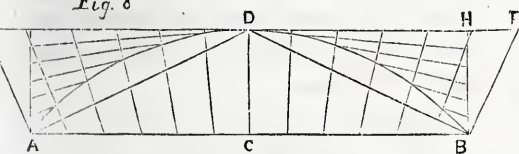
A LARGE BLOCK OF GRANITE.—At the granite quarries above Richmond, Va., a block of granite 95 feet long, 38 feet wide, and 31 feet deep, was blasted out. It contains 111,910 cubic feet, and weighs 9,326 tons, or 18,652,000 pounds.

LESSONS FOR LEARNERS.

CONCLUDING that our student readers have made themselves masters of the primary problems presented in the preceding number, we will now turn their attention to the methods of working out problems with ease and accuracy, in which the instruments which were of ready use in those problems might not be available, and therefore it is necessary to be acquainted with the means of attaining the required result without their assistance. We allude to the finding of centres, and describing of circles, arcs, and so forth.

PROBLEM XI. *To draw a segment of a circle by intersecting lines.*

Fig. 8



Let AB , be the length or chord of the segment, and CD , the height; draw the chord line DB , at right angles to which draw BF ; through D and parallel to AB , draw FE ; divide FE and AB into any even number of parts, say 10, connect those divisions by the line 1 1, 2 2, 3 3, and so on. Draw BB , perpendicular to AB , and divide it into 5 parts; from the centre, D , draw lines to these divisions, and where lines cross the lines 1 1, 2 2, 3 3, &c, are the points through which to trace the segment.

This mode of finding the line of a segment is most useful in practice, as an arch of any diameter, and of any height, and may thus by it, be at once formed without any of that trouble which is frequently encountered in the turning of segments to fill given locations where the instrument called the trammel is not handy.

We will now proceed to the subject of groin arching, and we would claim the

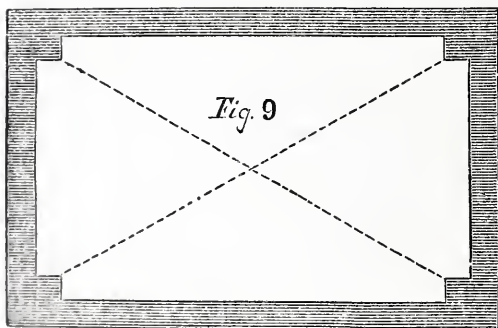
particular attention of the student to this subject as involving the most important problems in the principles of construction, without a thorough understanding of which it will be impossible for him to progress in the theory or practice of building. And here we will say a few words on the origin and nature of this peculiar form of construction.

The Roman architects have the credit of the invention of *vaulting*, if not of the *arch* itself, which is its principle. The absence of monoliths or stones of sufficient length and strength to span opens where a superincumbent pressure was to be provided for without having recourse to the use of timber, drove them to the necessity of invention to overcome the difficulty, having only their burnt-brick as a material. The knowledge of the *arch*, whether then suggested, or already acquired from the Etrurians, prompted the idea of a lateral continuation of that construction. At first this system of *vaulting* was used to cover in sewers, and then aqueducts, and the span being gradually increased, it was used under public buildings, the supports being at first solid walling. Intersection of these arched passages raised the demand for what is known by the name of *simple groining*; and this was followed by the substitution of piers for side-walls, and, consequently, additional arches to combine the whole. Thus the art of groining grew in difficulty as well as in beauty, until its elevation to adorn the overground construction, its strength had already upheld in the basement, gave to architecture all the elegancies of *ornamental groining*. After the Roman Empire had passed away, groining still grew in all the grandeur of Gothic design; and at this day, whether we find it in the amphitheatre at Rome, or in the crypts of

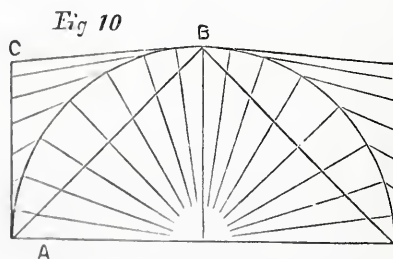
Canterbury, in all the might of its powerful strength, or in the gorgeous ceilings of cathedral grandeur, in all its developed beauty, it always elevates our thoughts, and inspires us with an awe of that superhuman power with which the GREAT ARCHITECT himself has gifted man in his own likeness.

But, as we will have to take up this interesting subject on a future occasion in these lessons, we will say no more at present than to repeat our desire of a careful study of the following:

PROBLEM XII. *To draw the arches of a groin, so that they shall intersect or mitre truly together over a straight line, from a given arch of any form.*



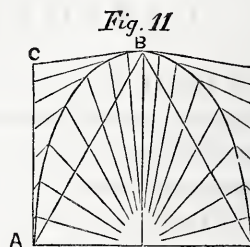
Suppose this to be the plan to be covered or groined over.



This is the arch of one side, which is here a semi-circle.

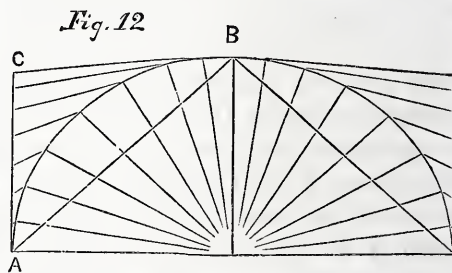
Draw the chord line A B, which divide into any number of equal parts; from the centre, draw lines through those parts, touching the arch; draw A C, perpendicular to the base line, and from the crown of the arch at B, draw lines through the points of intersection of the former lines with the arch-lines, to the perpendicular line A C.

Lay off the width of one of the other arches.



This shows the width of one end of the plan. Set the height of the middle of the arch the same as in the former figure; draw and divide the chord, as before, into equal parts, of the same number. Transfer the perpendicular A C, in Fig. 10. Draw radiating lines respectively, from the centre and from the crown, as done before, and through their points of intersection trace the arch-line.

Observe to duplicate this operation in each figure, so as to produce the complete arch-line.



Here is the form of the diagonal, or groin. It will be at once perceived that the only difference between it and Fig. 10 is in its greater span. The mode of tracing the arch-line is precisely similar to that shown in the two preceding figures.

This method of drawing the *groined arch* may be applied to any form of that figure, whether Elliptical, Circular, or Gothic.

THE steeple of Christ Church, Philadelphia, completed in 1755, is said to be the most durable and substantial in the city. The chime of bells hanging in it was the first imported into the United States.

AMERICAN INSTITUTE OF ARCHITECTS.

ESSAY BY A. J. BLOOR, F. A. I. A.

IN our preceding number we presented the practically useful paper of Mr. P. B. WIGHT, as read before the Institute, and we now give an extract from the exhaustive and highly interesting review and suggestions of Mr. A. J. BLOOR, the talented secretary of the same body, on "Architectural and Art Associations in Europe." We feel that we are not doing full justice to this excellent document in thus presenting but a moiety, and are doubtful whether we have selected that which is best where all is so good. However, we shall take the pleasing liberty of occasionally referring to it in the future.

TECHNICAL EDUCATION IN AMERICA.

In forming a judgment as to the best methods of instruction in Architecture for American youth, we will be careful not to accept any European system, without examining whether in all its parts it will suit the conditions of our community. Before our organization commits itself to the subject in a practical way, it is to be hoped that it will beforehand have collected all the detailed information and comparative statistics so essential to a just consideration of one of the most important questions with which it has to deal. Those of us who are Americans by birth, or who are of early adoption, and have been at school or college here, will find it difficult to believe, for instance that the American lad can be made to submit to the slow processes of technical instruction prevalent in Europe. It is true that the American youth needs to realize that the most thorough technical work in this country is apt to be done by those of foreign birth, but, on the

other hand it would argue great stolidity of apprehension or provincialism of feeling on the part of the latter were they not to realize that from whatever causes—perhaps the elasticity of the climate—the strain of pioneering blood inherited from their colonial ancestors—the confident and aggressive spirit created by the consciousness that they are the sons of the men who threw off the imperial traditions and yokes of the old world, and that they are the inheritors of a new one—the freedom of movement arising from their political institutions—from whatever causes—as the thoroughly-Americanized foreigners can hardly fail to realize—there are those conditions about Young America which beget an intuitiveness of thought, a quickness of action, and an impatience of slow results, which preclude the necessity, or at least expediency, of subjecting him to the tedious educational processes of Europe. Those Europeans who have not studied this subject, even from a dominantly European point of view, are the first to realize the necessity of some change in the *modus operandi*. Nay more, they seem to feel that it will not much longer be possible to pass even the European pupil through the old European crucible. Some of my hearers will remember the weighty remarks of the Rev. Dr. McCosh, pertinent to this theme, at his inauguration as President of Princeton College a few months ago.

One thing seems clear to me—that the tendency is not so much towards a universal curriculum, as in the University system hitherto—in which the student of a specialty finds that specialty holding only an equal rank with many

other studies, all of which he must adopt—as toward many special training schools, in which the student will find his specialty the central point, towards the enlightenment and mastery of which, as the business of his life, all the other studies tend.

Prof. Goldwin Smith, in an address last month, before the American Social Science Association, strikes the keynote of the question when he says:—“Supposing that general-professional and general studies were to be included in a University, the question would arise what professions should be admitted, and what subjects should be preferred for the general course. As to the first question, it was more easy to decide that since the recent multiplication of intelligent and scientific callings the list could no longer be confined to the sacred three—Theology, Law, and Medicine—than it was to decide where the limit was to be fixed.”

So, too, Governor Bullock, of Massachusetts, in a recent valedictory to the Legislature of that State, refers to the urgent necessity felt, not long ago, for organizing educational and inter-professional opportunity for the various professions which the activities of the age now call upon, and which, unlike those of the bar, the pulpit, and a few others, are still measurably destitute of the needed special appliances for technical training; and adds, in relation to what has been accomplished, that “The Institute of Technology, at Boston, to whose funds the State has largely contributed, the Lawrence Scientific School, at Cambridge, and the Worcester School of Industrial Science, founded on a liberal scale by private munificence, are landmarks in the same line of progress. Although the first of these has been in operation less than three years, its influence is already felt by the whole community.” And one of the prominent newspapers of our city—the *Times*—in quoting the Governor’s remarks, under the heading of “The New Professions—

Need of Museums of Science,” endorses them emphatically, urging, moreover, what is of particular interest to us of the New York Chapter of our Institute, that

“There is no State which needs the best instruction in natural science, and popular aids for the study of this branch, so much as New York. This city has become a vast manufacturing city. Manufactures of every description are extending into all the suburban districts; the professions are crowded, and the natural tastes of our youth do not run toward collegiate and classical studies. There is a continual call for skilled young men in all mechanical arts—without sufficient supply—and this city is a kind of centre of the demand for the best trained scientific heads in all practical departments. Here accumulates the capital which opens mines, builds railroads, starts new branches of manufacture, and sustains inventions—and here must come the men who would manage the scientific department of all these enterprises.

“The old idea that there are just three professions for every youth starting in his career, or that every boy who is not suited for business must go to college, is pretty much exploded. As Governor Bullock says, ‘new professions of immense importance and of great attraction to the young are now being opened. The superintendence of mines, the application of science to practical life in the arts and in useful and ornamental inventions; the necessary researches in soils, rocks, and minerals, which must precede important outlays of capital; the scientific branches of manufacture, and the artistic laying out of public and private grounds, form an almost entirely new field of labor for young men.’ They are branches, too, which command high salaries, and some of them of a somewhat free and adventurous cast. Many boys are fitted for them who are not in the least adapted for commerce, business, or the profes-

sions. Looked at, also, purely in an intellectual view, these branches stand now on a level with the old professions. Science leads the van of intellectual progress in this age. The most prominent intellects of the day are not the classical scholars or the lights of the pulpit and the bar; they are the great investigators in the field of natural science, the students of social and political economy, and those who have learned to apply the laws of nature to practical uses.

"How does New York satisfy this great tendency of the age? How does the commercial capital of the Union meet the demands of science? What have we here to train up our young men for these new professions, or even to give the masses who rule us the first rudiments of natural science?"

"We have, indeed, some sixpenny museums for children; a medley of animals in an old arsenal in the Park; some utterly unknown collections in the cellars of learned societies, and one small 'School of Mines' in Columbia College. Beyond these we possess absolutely nothing, so far as we can recall; no Institute of Technology or Museum of Zoology, as in Boston, or Scientific School, as in Cambridge; certainly nothing like the Zoological Gardens, or South Kensington Museum, or British Museum of London, or the hundreds which might be mentioned in Paris and Berlin, and Vienna and other continental cities.

"With the enormous wealth concentrated here, and the vast demand for such facilities and means of popular education, our condition in this respect is simply disgraceful. There is not, with the exception of the 'School of Mines,' a single institution of this nature which is beyond what might be required in a second-rate western village.

"Our youth who have the honorable ambition to cut out new lines of advance for themselves, who have no talent for business, and do not like either law,

medicine, or theology, as a profession, must go to Boston, or New Haven, or Germany, to fit themselves for the new professions. Our common people have no place in which they can study machinery, or animal life, or plants, or the structure of the earth, or any of the great facts in natural history. What more valuable thing for the culture and good habits of the masses could there be than such collections as are at Kew, or the South Kensington Museum, the Zoological Gardens and Crystal Palace of London? Why should Democracy be so much behind Aristocracy in the means of cultivating the masses?"

"The great results which Governor Bullock pictures in Massachusetts, in the formation of popular institutions for natural science, have only been brought about by a liberal appropriation by individuals of private wealth.

"It is mainly private benefactions of wealthy citizens which have founded these most useful schools and museums. Is there not private wealth enough in New York which will do as much for this city?"

It is somewhat remarkable, by the way, that in his enumeration of professions requiring specific educational appliances, the writer should have omitted his own specialty—inferior in importance, most people in these days of the third estate will probably admit, to none—of journalism.

It will be seen from the above that Massachusetts—as usual when intellect and social progress are concerned—takes the lead in the movement towards special technical education, while our own State, as yet, falls far behind, notwithstanding the step long since taken in an elemental direction, by Mr. Peter Cooper; and recently, in some degree, and on a more advanced plan, by Mr. Ezra Cornell. And my hearers will not need to be reminded that the Professorship of Architecture, in the Massachusetts Institute of Technology is filled by our fellow-member of the Institute, Mr.

Ware. Perhaps, also, they have noticed that it is not unusual for our newspapers to refer inquiring correspondents to his department as the best school for architecture in the country. The federal system provided for in the regulations of our Institute, is designed to secure friendly example and emulation between its local representative societies; and the lesson we should derive from the precedent of Boston and our fellow-members resident there is that, like them, we should continue by every legitimate means in our power to keep alive the interest of our local community until, like them, we can command a good library, museum, and architectural school. For, though our associates of Boston have the earliest succeeded in interesting their co-residents, we are none of us, probably, prepared to admit that our architects, as a body, deserve less recognition for their professional achievements, at the hands of our community, than the Boston architects do at the hands of theirs; nor is it a supposable case that in this commercial and financial metropolis of the continent, those who prominently represent its pecuniary means will be willing to allow their architectural representation to take a secondary rank.

The subscriptions already received from a number of gentlemen outside of the profession, (and who thereby become honorary members,) in answer to the circular in behalf of the Library Fund, attest that the President of our Institute, in his opening address at the Convention of a year ago, spoke prophetically when he confidently averred that "our efforts to develop architecture and its kindred sciences are viewed by many of our fellow-citizens with increasing satisfaction. Non-professional men, men of leisure—and many of them men of ample means—only require to have our schedule of contemplated labors placed before them and explained, and they will meet us with hearty co-operation."

MICHAEL ANGELO.

AN oration on "Michael Angelo, the Architect of St. Peters," was recently delivered at the Cooper Institute, New York, by Mr. William Parsons, before quite a numerous and discriminating audience. The speaker, who is one of the few distinguished lecturers the Old Country has favored us with of late years, spoke without notes or manuscript, and with vigor, fluency and beauty of language that evoked repeated rounds of applause. His peroration might very well answer for a classic model of scholastic declamation.

He began with a dissertation on the grand principles of art, its various manifestations in the artist mind, and then drew a romantic picture of the youthful Angelo, imbibing from the genius of Dante those sublime principles of poetry that create and perpetuate for all time new realms of beauty, glory, greatness or terror. Angelo began life as the apprentice of a stonecutter. His father, the Count du Buonarrotti, saw in the bent of his son's genius something which he mistook for a lower grade of art than that of sculpture, such as breathes into the dull, cold marble the wonderful presentiment of life; but Angelo felt that he was dedicating himself to what should illustrate the power and genius of his soul, and he lost no time and spared no pains to render himself an artist, the world has ever since agreed to pronounce the most perfect that ever lived. He spent ten years of unremitting toil as a student, rising step by step to better and greater efforts, until his native town of Florence was filled with his growing fame. But Angelo was a painter as well as sculptor. His breadth of mind and imagination seized upon all forms of beauty, and what he could not illustrate as he desired in marble, he transferred with wonderful force and effectiveness to canvas. In the budding greatness of his fame he met with Leonardo da Vinci,

one of the few supreme masters the world has produced in the realms of true art. Between da Vinci and Angelo a contest occurred of that extraordinary character that brings all the grand and ennobling passions and faculties of the human soul and mind into active play. They painted each a colossal picture of a battle, to one of which the art critics of Florence were to award the palm of excellence. Great was the rivalry of the two distinguished artists, but it was of that high, chivalric nature that scorns an unworthy advantage. The world knows a story of how a pupil of da Vinci's, unknown to his master, cut Angelo's picture in pieces, and how noble was the observation and unrevenged the spirit of the sublime artist as he simply exclaimed, "That is all I need to convince me whose picture excited the greatest envy." The tale of how Angelo painted for Pope Julius the

concave dome of the Sistine chapel is one of the thrilling pages that mark the life of this great man; how for years, by night and by day, he worked upon the ceiling, suspended a hundred feet from the floor; how he overcame the apparently insuperable difficulties of giving to a concave the appearance of a flat surface; how he followed up the seven subjects he took to illustrate by finally producing "The Last Judgment," the most wondrous, weird and terrible production of the human pencil that the world has ever seen. All these are themes that only genius can claim to offer, and then last, but not least, his final work at the age of eighty years, the dome, the vast and wondrous of St. Peter's at Rome, of which the world has not the equal. All these topics the orator, with a force and eloquence seldom heard in the Cooper Institute, vividly delineated.—*New York paper.*

UTILITY OF CONCRETE.

CONCRETE construction is now attracting so much attention, whether under the name of *béton* or *concrete*, in this country, as well as in Europe, that we think it right to inform our readers who may happen not to be acquainted with its merits, and the advantage to be derived from its use, of every thing remarkable that may transpire with regard to it.

The English builders who have been using it now for nearly forty years in foundations, and occasionally in superstructures, have added much to its capability as a most desirable material by the admixture of Portland cement in its composition, instead of quick-lime, as a binder, or by the conjunction of the two

in such proportions as to make due allowance for the swelling or shrinkage of either. The French builders long since improved on the coarse English concrete, by the using of clay, brick-dust, and plaster, with fine sand, making what they term *béton*, which composition gives a sharp outline in moulding and sets with such rapidity as to very much shorten the time required for construction.

The moulding apparatus has been greatly improved on by recent English builders, who make a speciality under "Royal Letters Patent," of constructing houses in concrete. A patent was sought for, sixteen years ago, in this country, for this very thing, by one of our Archi-

pects, and refused by the then Commissioner of Patents, at Washington, on the stupid plea that such a thing, or something like it, was done somewhere in France, by somebody or other already. This liberal decision, of course, put a damper on any further thought of improvement or invention in that line, and

now we have to take up the supposed ideas of the English patentee, and bear the stigma of having stolen them. But, it seems that the stultification practised at the Washington Patent Office is not likely to permanently subdue the efforts of Concrete to make its merits felt and acknowledged, and inquiries are being



made in all parts of this country as to its nature and use.

We have already, in former numbers of the REVIEW, given the proportions to be used, and a design for a small country church, to be executed in Concrete. We here present another.

In localities where masonry may prove expensive, or masons scarce, the labor of building in Concrete may be carried on by any one. In fact it requires only a competent overseer, who

has studied the operation and thoroughly understands it. There will arise little difficulties which such a person must be prepared for, and the inventive mind will find much to be thought on, and many things to be devised.

A *béton* superstructure on a *rough Concrete* foundation and base could be so moulded in any building form as to produce strength, comfort, appearance, and economy. Economy being dependent on cheapness of cement.

ANCIENT PRINCIPLES OF MECHANICS.

THERE is a pleasure to be derived from an occasional retrospect arising from the well founded satisfaction we feel in the palpable progress of our age. Taking the most undoubted authority for the facts of mechanical principles as understood in the palmy days of Greece and her architects, we see at once the triumphant advance we have made.

VITRUVIUS in his exhaustive writings on Architecture and its relations, thus speaks of contrivances for the removal of great weights. He says:—

“It will be useful to explain the ingenious contrivance of Ctesiphon. When he removed from the quarry the shafts of the columns which he had prepared for the temple of Diana at Ephesus, not thinking it prudent to trust them on carriages, lest their weight should sink the wheels in the soft roads over which they would have to pass, he devised the following scheme. He made a frame of four pieces of timber, two of which were equal in length to the shafts of the columns, and were held together by the two transverse pieces. In each end of the shaft he inserted iron pivots, whose ends were dovetailed therinto and run with lead. The pivots worked in gudgeons fastened to the timber-frame, whereto were attached oaken shafts. The pivots having a free revolution in the gudgeons, when the oxen were attached and drew the frame, the shafts rolled round, and might have been conveyed to any distance. The shafts having been thus transported, the entablatures were to be removed, when Metagenes the son of Ctesiphon, applied the principle upon which the shafts had been conveyed to the removal of those also. He constructed wheels about twelve feet in diameter, and fixed the ends of the blocks of stone whereof the entablature was

composed into them; pivots and gudgeons were then prepared to receive them in the manner just described, so that when the oxen drew the machine, the pivots turning in the gudgeons, caused the wheels to revolve, and thus the blocks, being enclosed like axles in the wheels, were brought to the work without delay, as were the shafts of the columns. An example of this species of machine may be seen in the rolling stone used for smoothing the walks in palæstræ. But the method would not have been practicable for any considerable distance. From the quarries to the temple is a length of not more than eight thousand feet, and the interval is a plain without any declivity. Within our own times, when the base of the colossal statue of Apollo in the temple of that god, was decayed through age, to prevent the fall and destruction of it, a contract for a base from the same quarry was made with Pæonius. It was twelve feet long, eight feet wide, and six feet high. Pæonius, driven to an expedient, did not use the same as Metagenes did, but constructed a machine for the purpose by a different application of the same principle. He made two wheels about fifteen feet diameter, and fitted the ends of the stone into these wheels. To connect the two wheels he framed into them, round their circumference, small pieces of two inches square, not more than one foot apart, each extending from one wheel to the other, and thus enclosing the stone. Round these bars a rope was coiled, to which the traces of the oxen were made fast, and as it was drawn out, the stone rolled on by means of the wheels, but the machine, by its constantly swerving from a direct straight forward path, stood in need of constant rectification, so that Pæonius was at last without money for the com-

pletion of his contract." Well, we are half inclined to be unkind enough to say that he deserved his fate for his bungling stupidity. But then he was not a Yankee.

VITRUVIUS continues his "principles of mechanics," and, for the amusement if not enlightenment of our readers we will continue in his company:—

"I have briefly explained," he says, "the principles of machines of draught, in which, as the powers and nature of the motion are different, so they generate two effects, one direct, the other circular; but it must be confessed, that rectilinear without circular motion can neither without the other be of much assistance in raising weights. I will proceed to the explanation of this. The pulleys revolve on axles which go across the blocks, and are acted upon by straight ropes which coil round the axle of the windlass, when that is put in motion by the levers, thus causing the weight to ascend. The pivots of the windlass axle are received into or play in the gudgeons of the cheeks, and the levers being inserted in the holes provided for them in the axle, are moved in a circular direction, and thus cause the ascent of the weight. Thus, also, an iron lever being applied to a weight, which many hands could not remove; if a fulcrum be placed under it, and the tongue of the lever be under the weight, one man's strength at the end will raise the weight. This is accounted for by the forepart of the lever being under the weight, and a shorter distance from the fulcrum or centre of motion; whilst the longest part, which is from the centre of motion to the head being brought into circular motion, the application of few hands to it will raise a great weight. So, if the tongue of the lever be placed under the weight, and instead of the end being pressed downward it be lifted up, the tongue then having the ground for a fulcrum, will act on that as in the first instance it did on the weight, and the tongue will

press on the side thereof, as it did on the fulcrum; though by this means the weight will not be so easily raised, yet it may be thus moved. If the tongue of the lever, lying on the fulcrum, be placed too far under the weight, and the end be too near the centre of pressure, it will be without effect; so, as hath been already mentioned, will it be, unless the distance from the fulcrum to the end of the lever be greater than from the fulcrum to the tongue thereof. Any one will perceive the application of this principle in the instruments called steel-yards; for, when the handle of suspension, on which as a centre the beam turns, is placed nearer the end from which the scale hangs, and on the other side of the centre, the weight be shifted to the different divisions on the beam, the further it is from the centre, the greater will be the load in the scale which it is capable of raising, and that through the equilibration of the beam. Thus, a small weight, which, placed near the centre, would have but a feeble effect, may in a moment acquire power, and raise with ease a very heavy load. Thus also the steersman of a merchant-ship, holding the tiller with only one hand, by the situation of the centre, moves it in a moment as the nature of the case requires, and turns the ship though ever so deeply laden. The sails, also, if only half mast high, will cause the vessel to sail slower than when the yards are hoisted up to the top of the mast, because not then being near the foot of the mast, which is as it were the centre, but at a distance therefrom, they are acted on by the wind with greater force. For as, if the fulcrum be placed under the middle of a lever, it is but with difficulty that the weight is moved, and that only when the power is applied at the extremity of the lever, so when the sails are no higher than the middle of the mast, they have less effect on the motion of the vessel; when, however, raised to the top of the mast, the impulse they receive from an equal wind higher up,

causes a quicker motion in the ship. For the same reason the oars, which are made fast with rope to the thowls, when plunged into the water and drawn back by the hand, impel the vessel with great force, and cause the prow thereof to cleave the waves, if their blades are at a considerable distance from the centre, which is the thowl. Also, when loads of great weight are carried by porters in gangs of four or six, the levers are so adjusted in the middle that each porter may be loaded with a proper proportion of the burden. The middle parts of the levers for four persons, over which the tackle passes, are provided with pins to prevent it sliding out of its place, for if it shift from the centre, the weight will press more on the shoulders of him to whom it is nearest, just as in the steel-yard the weight is shifted towards the end of the beam. Thus, also, oxen have an equal draft when the piece which suspends the pole hangs exactly from the middle of the yoke. But when oxen are not equally strong, the method of apportioning to each his due labor is by shifting the suspending piece so that one side of the yoke shall be longer than the other, and thus relieve the weaker animal. It is the same in the porters' levers as in the yokes when the suspending tackle is not in the centre, and one arm of the lever is longer than the other, namely, that towards which the tackle has shifted; for, in this case, if the lever turn upon the points to which the tackle has slid, which now becomes its centre, the longer arm will describe a portion of a larger circle, and the shorter a smaller circle. Now, as small wheels revolve with more difficulty than larger ones, so levers and yokes press most on the side which is the least distance from the fulcrum, and on the contrary they ease those who bear that arm which is at the greatest distance from the fulcrum. Inasmuch as all these machines regulate either rectilinear or circular motion by means of the centre or fulcrum, so also wagons, chariots, drum-

wheels, wheels of carriages, screws, scorpions, balistæ, presses, and other instruments, for the same reason produce their effects by means of rectilinear and circular motions."

LOSING NERVE.

There are many cases on record of men of professional experience losing their nerve when most needed. One case was that of an Architect, thoroughly used to walk about on all parts of houses in course of construction, who once, when walking along a plank which joined two walls at a great height from the ground, felt a sudden sense of danger, upon which his senses left him, and only returned after some seconds, when he awoke, so to speak, in the arms of one of the masons, who had most fortunately seen his state in time to carry him across the plank at the risk of his own life.

A more curious case requires a little previous explanation. Some years ago the paintings on the inside of the dome of St. Paul's, London, wanted repair. It was contrived, in order to save trouble and expense, that a suspended scaffold should be made, supported by a ledge half a yard wide, and hanging by ropes through holes in the dome. An experienced ships' carpenter undertook the job, and began by stepping forward out of a small door at the foot of the dome on the ledge in question, from which there was a clear fall of two hundred feet to the pavement. He walked a few steps, and then found that the inward curve of the dome made him unable to stand upright, and caused him to lean over dangerously, with an altered and unsteady centre of gravity. Seized all at once with an overpowering sense of fear, he managed, nevertheless, to turn his face to the dome and to rest, being once more able to stand upright, till he had recovered his senses. Then, to his horror, he found he had forgotten on which side

of him the door was, or how far off it was, and in trying to get to it by short sidelong steps, took the wrong direction, and literally walked in search of it round the whole base of the dome, falling into the door at last utterly prostrated, and feeling, as he said, "ten years older." However, he made the scaffold afterward, and used to tell the story of his fright, while walking about on the ledge, in the most unconcerned way.

EDUCATIONAL ARCHITECTURE.

IT is our intention, under this head, to give from time to time, views and descriptions of Collegiate Institutes and Seminaries throughout the country, commencing in our next number. And as it must be obvious to all friends of education that the most fitting buildings are always desirable, we see an immense advantage derivable from this suggestive course. Whether a new edifice be in contemplation, or an old one stands in need of improvement, this panoramic illustration of constructions already in existence cannot fail to be of use alike to the Architect and the building committee. In carrying out such an idea, we shall look for the friendly aid of presidents and principals, as well as of the trustees, of all educational institutes, in city and country, throughout the Union, and we trust we shall not look in vain. It is a subject of paramount importance, and one that should be most thoroughly attended to; as, through such means, faults of plan or construction, which have been discovered by experience, can be made known, and thus their repetition be easily avoided. Besides any other illustrative matter, we would be anxious to receive accurate information on the subjects of ventilation, heating, lighting recreative facilities, and general accommodation.

We are confident that the principals of the various academies will see this

matter in its most useful phase, and aid this project to the utmost.

Manufacturers of *School Furniture* will find us ready to place before our readers any improvements they may have made, accompanied by engravings of the same.

Publishers of *School Books* will also find in this department of the REVIEW a channel of communication with the executive of each institution and secure their attention.

To all who take an interest in the designing, the constructing, or the furnishing of schools, of every class, we offer a free and friendly invitation to use this department of our magazine for the benefit of the great work of mental cultivation, as far as our specialty goes.

FIRE-ALARM, by M. DION.—At a recent meeting of the *Franklin Institute*, in this city, there was presented by Mr. J. Demorat, for exhibition, an improved fire-detector, which consists of two parts, one of which is placed in the location where the presence of fire is to be detected, and the other where the alarm is to be given. These are to be connected by wire in the manner of ordinary bells, except that the wire is tightly stretched in its normal condition. The first instrument consists essentially of a catch (holding one end of the wire,) controlled by a copper helix, whose expansion will liberate the catch, and thus slack the wire. The other instrument consists of an alarm-bell, operated by clock-work, which goes into action as soon as the wire is slackened.

By changing the tension of the copper spring, the instrument may be set to go off at any temperature indicated by a dial and pointer attached to the regulating screw.

When exhibited to the meeting, the instrument was started by holding it for a moment over a gas-flame, and by the mere warmth of the breath.

CEMENTS.

THE great demand for cements, to be used in building, leads to serious inquiry as to the best, and, at the same time, most economical of these admirable aids to construction.

The hydraulic cements of this country have a very remarkable quality of quick setting, and this quality though under water generally very desirable, is too often a great inconvenience in building on land. Here what is termed *Portland Cement*, being first made at the Isle of Portland, county of Dorset, on the southern coast of England, has advantages over our American cements, in the slowness of its setting, and its superior hardness when set.

Now, it is well worthy of studious inquiry, if our cements cannot be brought to the same condition as the Portland, by so proportioning their component parts as to reduce the rapidity of induration, without decreasing the strength or durability of the material.

The *Scientific American*, in its issue of August 21st, has the following interesting editorial on PORTLAND CEMENT:—

“The composition of Portland cement is argillo-calcareous; that is, it is formed of clay and limestone, generally containing some silica, the properties of which may vary without injury to the cement. The proportion of clay may also vary from 19 to 25 per cent. without detriment.

“It is found native at Boulogne, France, in the inferior cretaceous formation. The only necessary condition for the formation of a good artificial Portland cement, is an intimate and homogeneous mixture of carbonate of lime and clay, the proportion of clay being as above stated.

“The materials are raised to a white heat, in kilns of the proper form, so that they are almost vitrified. After the calcination all pulverulent and scorified

portions are carefully pricked out and thrown away. The remainder is then finely ground and becomes ready for use.

“The amount of water which enters into combination with it in mixing is about 0.366 by weight. It sets slowly, from twelve to eighteen hours being required.

“Ordinary hydraulic or water cements set very quickly, some of them setting in three or four minutes under water at 65° Fahr. The time of setting varies from this to four hours, according to the character of the cements. They contain larger amounts of silica and alumina than any of the other limes, and also contain magnesia, which Portland cement does not. They will not slake after burning, nor shrink in hardening, like the fat limes, and may be used without sand, the latter being only used for economy.

“The slow setting of Portland cement renders its use very convenient for many purposes, as a much larger quantity can be mixed at once than can be done with hydraulic cements. When properly made, and this can always be determined by proper tests, it is undoubtedly a durable and strong cement. It has been successfully applied to concrete building, road-making, lining of iron pipes and cisterns, marine architecture, etc.

“It seems to be growing in favor, and its manufacture is on the increase. In England large quantities are made, chalk being the formation from which the carbonate of lime is obtained. It has been largely used in the construction of foundations for bridges, some of which have stood from sixteen to eighteen years, showing no symptom of failure. Extensive sea walls have been built with this material in the Mediterranean.

“Mr. Hawkshaw, a well-known engineer of note, says, he has used Portland

cement in a tideway, and has met with no difficulty. Neither has he found any difficulty in using concrete blocks in similar situations. Many others testify to its good qualities, and there is no doubt in our minds that its use may be greatly extended with advantage."

WHITEWASH.—A little whitewash, says the *Boston Journal of Chemistry*, will do a great amount of good; but a full supply, enough to cover the inside of barns, stables, cellars, &c., with two good coatings, is much better.

The lime which enters into this composition is a purifying agent, and the wash serves as a disinfectant. The benefits conferred in this regard compensate for all the labor and expense involved in whitewashing; but the clean, tidy appearance which it gives to farm premises is most pleasing and salutary. In no way can a farmer make so imposing and even elegant show for trifling expenditure as by a free use of whitewash. Even old buildings glow and glisten under the whitewash brush, and assume a new appearance. Buildings, in the eyes of the owner as well as those of his neighbors, have a higher money value after the process is over.

VENICE is built on 177 islands. The Grand Canal was cut over the flats, and makes the Corso of the city, or the grand boulevard of Venice. It cuts the city into two equal parts, and is serpentine in its course. From these start out a great number of smaller canals, which correspond to streets in other cities. There are 150 small canals; add to these the small roads or streets of the city, and the whole amounts to 2,480. Religiously, Venice is divided into 30 parishes, with 100 churches. There are over 200 squares. The churches and palaces are built on piles which number many millions. The canals are crossed by 400 bridges.

RULES FOR COMPUTING SLATE AND SLATING.

AS a roof-covering this material has become so popular of late days in this country, that the following rules will be found very useful.

In order to find the required amount of slate to cover a certain given area of roofing, take three inches from the length, or as many as the third covers the first, divide the remainder by two, and multiply the quotient by the width of the slate, and the product will be the number of square inches in a single slate; multiply the number of square inches thus procured by 144 (the square inches in a foot) and the quotient will be the answer.

A Square of Slating means ten feet each way; or a hundred square feet, when upon the roof.

When slate is bought and sold by the square, nothing being said of the measurement, it is invariably the rule to allow three inches for the distance the third covers the first; or, as slaters say, three inches second lap.

The contents of a roof is found by multiplying the length of the ridge by the girth from eave to eave, and in slating just so much allowance must be made for the double row of slate at the eave as there would be in a single row of slate. For example:—If the slate be sixteen inches long, they will lay six and a half inches to the weather. So, six and a half inches should be allowed.

On *Valleys* and *Hips* one foot is allowed for the extra labor of cutting, fitting, and laying, as well as the waste of slate. For example:—If a valley or hip is twenty feet long, twenty feet will be added to the surface measure of the roof.

There is no deduction made for chimneys, scuttles, or other necessary openings, unless they are more than four feet square, owing to the extra trouble and waste of material in working around them.

PERMANENCY OF TRUE ARCHITECTURE.

CONSTANTINOPLE, the capital of Mohammedism to-day, was once the Christian rival of the then pagan Rome. But the architecture of the empire city of the Tyber was immovable, and all the dominative efforts of the great Christian prince could not change its prestige to the banks of the Bosphorus.

Centuries of tasteful construction had laid a foundation which no mere human effort could uproot. Rome had the throne of Taste, and all that Goth or Vandal, in jealousy, could do, failed to dethrone her. Nay, even as we have said, the imperial leader of the Christian world, the great Constantine himself, with all his arduous efforts, failed to transfer one solitary ray of artistic grandeur from her to her pseudo rival. Rome in her architecture remained.

The power of architectural greatness seems to endure forever. It outlives the dilapidations of time; for, even where no solitary stone remains of what once builded up its fame and the locality of the very sight is questionable, the wonder it has caused still echoes in the world. How many cities of the past have become invisible, yet remain in history, and even grow in grandeur through the very dimness of the intervening ages which hide their defects of outline from the view.

The exertions of Constantine for the advancement of Christianity had met from the inhabitants of Rome, who were pagans, decided opposition and resistance, in consequence of their attachment to their ancient deities; and it happened, that in the year 324, on occasion of an annual customary procession of the army, in honor of some of the heathen deities, to the Capitol, Constantine was induced to express his sentiments against it in terms so strong as to draw on him the hatred of the senate and

people, who regarded their religion as insulted. Their execrations in consequence appear to have been so vehemently uttered, that in a short time he found a residence at Rome no longer tolerable; and he therefore formed the resolution, which, in the same year, he carried into effect, of removing the seat of the empire. His first intention was to have fixed it on a spot near the ancient Ilium or Troy, probably adopting the idea of those who have conceived that the Latin kingdom was founded by Æneas and the other Trojan princes, who, after the destruction of Troy, are supposed to have settled in Italy. Here he had already made a slight attempt towards laying the foundations of his intended new city, when, discovering superior advantages in the situation of Byzantium, he changed his resolution as to the place, and thither transferred his materials and workmen.

With the view of suppressing idolatry at Rome, by the removal of the objects of pagan devotion there, of adorning his new city with as many of the finest remains of ancient architecture as he could procure, and of lowering the importance of Rome as a rival, by stripping it of those recommendations and attractions which it had formerly enjoyed, Constantine had transferred from all the principal buildings at Rome, statues, basso-relievos, columns, capitals, and all such other ornaments and members of architecture as could be employed in the erection of those edifices which he meant should enrich his new metropolis. These he transported to Byzantium, the name of which he afterwards changed to that of Constantinople, (the City of Constantine,) taking with him also from Rome, all the ablest architects and workmen he could procure, for the purpose of rendering his intended capital superior, if possible, to

ancient Rome, in its full height of splendor.

It soon, however, became evident, that the architects he had engaged were greatly inferior in skill to those who had planned and erected the former buildings at Rome; for though, having obtained columns and other materials ready wrought, nothing more was wanting than a judicious distribution and arrangement of the whole, founded on the best rules of symmetry and proportion, yet in these last particulars the erections at Constantinople were extremely defective, and in no respect to be compared with those which had existed before at Rome, as evidenced by the few which survived the almost universal destruction there.

If the architects of Constantine were deficient, as they unquestionably were, in their knowledge of the principles of the science, and in judgment to prefer the approbation of the intelligent and judicious to the applause of the uninformed, it is certain they were by no means unacquainted with the facts, or disinclined to avail themselves of them, that the number of competent judges on every point of taste is always extremely small, and that the multitude are easily attracted by profusion of ornament. Real merit, arising from the exercise of sagacity, and the nice adjustment of forms and proportions, which could be estimated by a very few only, was with them, therefore, a qualification not worth the pains of acquiring; but as their object seems to have been extensive more than solid reputation, they found it more to their purpose to employ splendor of decoration. Experience had shown, in the instance of buildings at Rome, where it had been introduced, the fondness of the generality for variety of forms and colors, and they, therefore, were lavish in the use of mosaic, a mode of ornament produced by bedding in mortar pieces of variegated marbles, or variously-colored stones, so as to form a kind of pavement, in all the diversi-

ties of form, pattern, and color, that a capricious and desultory imagination could suggest. This method, originally invented, as it is supposed, among the Persians, and from them transferred to the Greeks, had, together with the first idea of architectural science and decoration itself, been introduced at Rome. But, though rich and dazzling in its effect when completed, it is wonderful it should have been ever adopted, as its progress in the execution must have been necessarily so slow, from the infinity of pieces of which any one pattern consisted, that the labor of years by a multitude of workmen must have been requisite for the completion of only a very few square feet in measure.

The churches of Santa Sophia at Constantinople, St. Paul without the walls of Rome, and St. Mary the Great, there—the former as exhibited by Grelot, and the two latter in prints by Piranesi, from the paintings of Paul Panani—are adequate examples of this style of building; but the remains at Constantinople of any of the magnificent buildings of Constantine, so often spoken of, are so few, if any, (for none but those of his palace are recollected,) and the appearance of the erections now existing there, is so far from splendid, that there is reason to doubt whether their supposed excellence has not been much overrated.

It is not thus with the remains or even the shadow-memories of ancient Rome—they are undoubted, because we have to-day collateral evidence of the spirit of them in the time-defiant monuments which still stand as guardians of the glorious memories of the past.

Rome has attained to true architectural construction, that fact lives, and will live for ever.

The work of closing the underground tenements in New York is being energetically pushed by the Board of Health of that city.

THE BEST BUILDING MATERIALS.

NOT having received a copy of the following in time for a notice in this number of the REVIEW, and being anxious to pay the earliest attention to this subject, we have availed ourselves of the excellent remarks and excerpts made by the *United States Railroad and Mining Register*, of this city. In our next number we will resume the subject:

"A valuable 'Report on Building Stones' has been made to the New Capitol Commissioners of the State of New York, by the distinguished State Geologist, Professor James Hall, whose palæontological researches have made his name famous throughout the scientific world, and who has just added to the State Museum, at Albany, a compartment in which all the building stones of the Eastern and Northern States are represented and classified for public inspection. We greatly need such an exposition in Philadelphia for the permanent use of our mechanics, civil engineers and master builders. Railroad companies and owners of real estate would find it to their advantage to take the initiation of such an enterprise, as there is such a lack of intelligent appreciation for such things at Harrisburg. It would be very easy for some enlightened Philadelphian to give a few thousand dollars to the Academy of Natural Sciences in Broad street, on condition that the curators should provide space in their new building, and pledge themselves (which they would be only too happy to do) to arrange such a systematic, economical museum of building stones, apart from their cabinet of minerals.

"Mr. Hall was commissioned to collect specimens, examine quarries, and subject the rocks to a variety of practical tests, in view of the erection of the New Capitol in Albany. Mr. Hall says:

"'In order to have before you the tangible results of this investigation, I have brought to Albany, and deposited in the Geological Rooms, specimens from the greater part of the quarries examined. In nearly all cases the specimens were freely contributed by the proprietors of the quarries, and some of them in the most liberal and handsome manner. The materials now arranged in the hall of the Geological Rooms, though far from complete, constitute a valuable and instructive series of building stones; from among which, I believe, satisfactory selections may be made, not only for the construction of the new capitol, in its foundations and superstructure, but they will serve as a guide for architects and others in the selection of materials for other purposes.'

"He divides the varieties of rocks offered in nature, from which we are compelled to make our selections for building purposes, into four classes: 1. Granites, including sienite, gneiss, &c.; 2. Marbles, or metamorphic crystalline limestones; 3. Limestones not metamorphic, compact or subcrystalline; 4. Sandstones or freestones, and their varieties, resulting from admixture of clay, or carbonate of lime, &c., with an almost infinite variety, in each class, of texture, color, power of resistance to pressure, and durability. He draws the attention to the fact that—

"'A sandstone is rarely a purely silicious rock, or a limestone a purely calcareous or celcareo-magnesian rock: other materials foreign to their strict constitution, according to the usual designation, entered into their composition, and, for the most part, to the injury of the mass. In the purely sedimentary rocks, which had undergone no subsequent change, the sandstones are more or less permeated by argillaceous

matter or clay, which constituted a part of the original sediment, and which may be uniformly mingled throughout the entire mass, or may form thin layers or seams separating the harder layers. In either case it is a dangerous ingredient; for no rock with clay seams can long be exposed to the weather, without a greater or less degree of separation or disintegration; and when any considerable amount of the same material is distributed through the mass, its ready absorption of water renders it equally dangerous to the stability and integrity of the whole. Placed beneath the surface, and beyond the reach of frosts, the conditions are different, and such rocks last for an indefinite period of time.

“The same remarks hold true with regard to limestones; and there are few limestones that are not marked by partings of shale or clay, which, in the course of time, weather into open seams, causing those unsightly appearances so common in structures of this kind.

“In the granite and crystalline limestones, other causes, as the want of cohesion among the particles, presence of destructive agents or liability to chemical changes, and seams or patches of foreign matter, are symptoms to be guarded against. It is not because a rock offered as a building stone is a *granite*, a *marble*, a *limestone* or a *sandstone*, that it is good or bad; but this characteristic is to be sought in other conditions, and the objectionable feature may be accidental or adventitious.

“One other condition should be remembered. These materials used for building are not promiscuously distributed over the country, but are restricted to certain geological formations, and can only be found within certain limits. Although we find granite, gneiss, and various sienites, with crystalline limestone, in the mountainous regions of Northern New York, it would be quite absurd to look for rocks of this kind in the Catskill mountains. We find white and variegated marble in the region skirting

the Highlands on the east, and extending through Western Connecticut, Massachusetts and Vermont; but no well-informed person expects this material in the Helderberg mountains, or in the hills of the southern counties of New York. Investigation has shown that certain kinds of rock, or rocks of similar but very distinct characteristics, are confined to certain geological formations, and do not occur out of these; and, again, that these formations have certain limits which are already defined and well understood. Geology has so well defined these matters, and the association of certain rocks and minerals, that when told that a known geological formation covers a portion of country, we know what kind and character of rocks and other mineral products to expect.”

“He then takes up and describes the four classes of building rocks in the order given above, giving the locality of their quarries and their local variations in value for the builder. We refer our readers to this lucid sketch, done with a master’s hand, and condensing all that is practically worth knowing, with an entire absence of that vague and speculative discussion which is so common, and so discouraging to the business reader. But his fifth chapter ‘On the selection of Building Stones, and the Causes of their Decay,’ is so important for the large and simple rules which it promulgates, that we shall give it entire in our next number. Architects and engineers should keep it as a *vade mecum*, until its principles become a part of their profession; for although it contains only what every intelligent and practised architect will swear by when cross-questioned, few men remember its truths at the proper times for acting upon them, and to those who employ the builders—to men of capital—to building committees and commissioners, they are revelations which they would do well to heed.

“We limit this notice to the state-

ment of one or two of Mr. Hall's conclusions; and if our readers are surprised at their nature they have only to get the report (published by J. Munsell, 82 State street, Albany) and they will be satisfied. For reaching these conclusions the Commissioner examined those public buildings of his own and other States which have been standing, with their walls and columns exposed to the corrosion of the elements, for thirty, forty, fifty or more years, and he describes in his report the amount and kind of their decay. We had the pleasure (shall we say?) to examine with him the façades of our Custom House and Mint, the Girard Bank and other newer works, and were shocked at the aspect of decay which the less carefully selected blocks and courses of which they are composed, present already to the eye. In places, they are actually melting away and falling to pieces from the action of the air upon the streaks of soluble material which formed a part of the original deposit.

"The first conclusion which Mr. Hall arrives at is this: that the ordinary tests for the strength of stones is not to be relied upon. He says:

"Even with all the experience we have had, and the experiments that have been made, there seems to be no settled opinions or knowledge among engineers regarding the real strength of the various kinds of stones, either in regard to their direct resistance of pressure or their lateral strength. According to the report of Prof. Henry, the Commissioners appointed to test the stone preparatory to the erection of the extension of the United States Capitol, found that the practice heretofore adopted for testing the strength or resistance to pressure was very defective, and the results unsatisfactory. If the result thus obtained be admitted, and of which there can be no doubt, the statements heretofore recorded on these points, and the tables compiled from the experiments made, are to be regarded with

many grains of allowance in favor of the stones tested. While the instruments employed by Rennie and others were defective, the plan of placing the block of stone to be tested between steel plates with a sheet of lead intervening, in order to equalize the pressure from irregularity of the surface of the stone, or want of parallelism in the opposite faces, gave very imperfect results.

"In experiments reported by Prof. Henry, we have the example of a cube of marble placed between steel plates, with lead intervening, giving way at a pressure of 30,000 pounds; while another block of precisely similar character placed directly in contact with the steel plates, sustained a pressure of 60,000 pounds. This interesting fact was verified in a series of experiments embracing samples of nearly all the marbles under trial, and in no case did a single exception occur to vary the result. The explanation of this remarkable phenomenon, now that the fact is known, is not difficult. The stone tends to give way by bulging out in the centre of the four perpendicular faces, and to form two pyramidal figures with their apices opposed to each other at the centre of the cube, and their bases against the steel plates.' * * *

"In estimating the strength of a stone to resist pressure, it is not always safe to predicate an opinion upon examples of cracking or breaking in the walls of a building, whether before or after its completion: for a little inequality in the bedding may produce such a result, when, if evenly bedded, the stone would have borne many times the load it has sustained.' * *

"Another conclusion to which he comes is of importance to Philadelphians who, with a whole empire of rock at their command, seek for building materials at distances by land and water hundreds and thousands of miles away, in Vermont, on Boston Bay, in Pictou, in Normandy. He grants that

granite is as good a rock as man can build with, when it is the proper kind of granite; but he shows that some of the commonest of our quartz rocks or silicious sandstones, and some of our commonest blue limestones are equally valuable, although our city architects despise them, or are ignorant of their existence. The encrinal limestones of the Mohawk valley make beautiful and lasting building stones. Now if Philadelphians would but consult the pages of the Final Report of the Geological Survey of Pennsylvania, they would find themselves in condition to open quarries in our Schuylkill, Susquehanna and Juniata valleys, upon immensely extended outcrops of all the building rock formations of the Mohawk valley. The time will come when the huge ribs of the Coal Measure Conglomerate at Pottsville, of the Medina sandstone in the Kittatinny, Jacks and other mountains, the limestones of Stroudsburg, Lewistown, Altoona and Bedford, the Pulpit Rock cliffs of Huntingdon, the Tionista sandstone of Clarion, Elk and Chesterfield, the Mahoning sandrock of the Broad Top, Somerset, Ligonier and Latrobe, and the limestones of Lancaster and York, will supersede the wretched clay sandstones of Norristown, Newark, Hartford and Pictou, and will have fronts as beautiful and curious and permanent as that of the Capitol of Tennessee.

"There is but one sure test of the eternal durability of any rock. Let the builder search for it where it rises in ridges from the meadow or stands in the cliffs above the stream, grey with countless ages, spotted with lichens, and shaded with shrubs, but whole and sound and placid, as if it knew its indestructibility, and had no fear of any future. That is the rock to build with; and utility and beauty in this as in so many other things go hand in hand, if men but knew it."

We commend this article to the attention of our professional readers.

FURNACES AND RANGES.

AS winter approaches the subject of heating forces itself upon our consideration, and when we look around us and see the phalanx of inventions, of all sorts and of all claims, we feel something like a pleasure-seeker who has got himself into a labyrinth and knows not which way to turn! How unenviable must be the lot of the unfortunates at Washington, whose stipendary fate it is to sit daily in solemn inquest on the merits, existent or non-existent, of the devices which pass in solemn array before them, each a confident claimant of a "patent" whereby his special benefit to mankind may be protected. There can be but one "best," and that one every one claims to be.

To decide in such a turmoil of assertions is a truly difficult matter, and to experiment with even a few, is expensive and annoying. In such cases it is best then to study the principles upon which each is founded, and to see clearly how it will work.

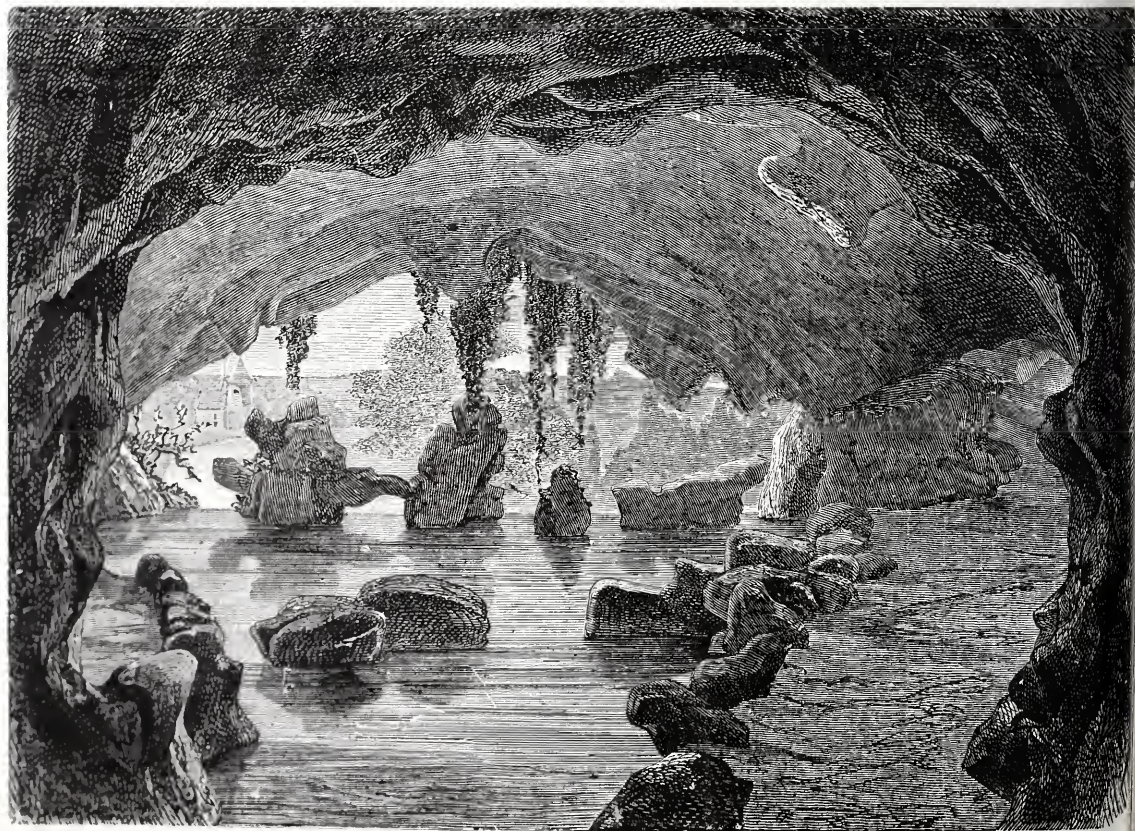
If reputation amounts to anything in so deciding, that which has the best is, so far, worthy of consideration. The Golden Eagle Furnace and Range presents many advantages on the score of air-tightness, as well as for efficiency, durability, and pleasantness of the air produced. The wide spread good name this furnace has attained is at least some guarantee of its superiority, and will, we doubt not, induce those of our readers who are in quest of something really reliable to call upon its manufacturer and give it a fair trial. As an excellent portable air-tight furnace, constructed on true philosophical principles, it must take its place in the foremost rank of the truly deserving claimants for public patronage.

The City of Paris is about to purchase the Pompeian Palace constructed by Prince Napoleon, and sold by him two years ago to a society which has failed.





A NATURAL BRIDGE



BOIS DE BOULOGNE.
A GROTTO.

THE PROMENADES OF PARIS.

IN these days of peerless parks, with their fascinating "drives," we have in this pleasure-seeking country of ours an abiding interest in all those beautiful successes of art which Paris delights in, and which so attract the visitor to the banks of the Seine.

Refreshed and beautified by the infallible hand of taste the Gallic Capital has, under its present liberal and enlightened Emperor, redoubled its claims upon our attention, and in nothing more than in the skill and energy with which its beautiful rural resting-grounds have been laid out and decorated, as though the exclusive demesnes of princes.

The Architect and the Landscape Gardener have made common cause, and, taking Nature in her most pleasing attitude, have so bedecked her with bewitching art, that the senses are led captive, and all who see must own the power which has been brought to bear to witch us into admiration. We promised our readers a peep or two at the varied beauties of Paris and its environs as illustrated in the splendid work now in course of publication, by Mr. J. ROTHSCHILD, of that city, entitled, *Les Proménades de Paris*, and which promise that gentleman now enables us to perform, by forwarding to us selections of engravings from the book in question, which we will present, seriatem, in the succeeding numbers of the REVIEW. We give now two charming contributions of Nature and Art, which beautify the BOIS DE BOULOGNE, though they are but a small part of the sylvan graces which make that world-renowned suburban park the Paradise it is.

The one represents a grotto of most fantastic wildness; the other a brook spanned by a primitive arch of rocks laid together in most tasteful negligence.

The work which Mr. ROTHSCHILD is now publishing is one which should command a sale in this country, when we consider the vast designs and improvements it suggests to us in the formation of our public parks, as well as in the architectural embellishment of streets. We feel that such a publication is now timely, when New York, Brooklyn, Philadelphia, Baltimore, and Chicago, are all extensively engaged in laying out parks, of artistic effect, founded in great part on natural beauty; New York having already gone far in the work of her exquisite *Central Park*, and Baltimore in her *Druid Park*, with its magnificent old growth of timber, which places it so far in advance of more youthful aspirants. And our own *Fairmount* which must, with its magnificent Schuylkill, and its wide spread sylvan beauties, yet take a prominent position among the foremost parks of the world. These alone are sufficient to turn attention to the attractive subject of this French publication, not to speak of the future of our multitude of expanding cities whose denizens will not fail to emulate the work of their neighbor States, and possess themselves of beautiful breathing places where tired humanity may find a delightful recess, and resuscitate the life within them amid the luxury of rural beauty and well-trained effect.

As we stated on a former occasion, this fine work is entitled "*LES PROMENADES DE PARIS, Bois de Boulogne et de Vincennes, Parcs-Squares-Boulevards.*" It is conducted by Monsr. A. ALPHAND, Chief Engineer of the Imperial Corps of Engineers of Bridges and Highways, Director of the Promenades of the City of Paris, &c.

It is profusely illustrated on steel and wood, by the best artists of the French,

as well as from drawings by their leading architects. There are also chromos of great beauty, designed by hands well skilled in this latter art, and the style in which the whole work is executed on paper of surpassing quality must make it welcome to every library

and boudoir where excellence is a recommendation.

The Agent appointed in the United States for LES PROMENADES DE PARIS, is Mr. F. W. CHRISTERN, 77 University Place, (one door from Fourteenth street,) New York.

FAULTS TO BE AVOIDED.

"Precedents cannot be admitted in extenuation of faults."—DR. JOHNSON.

THE following "cautions" to young designers, by Professor Richard Brown, one of the best English authorities of his day on the subject of architecture, although given nearly thirty years since, may be relied on in many of the points even now. Of course we must make some allowance for the difference existing between the prevailing malpractices then to be guarded against, which do not now exist; and we must likewise remember that the customs in use in England are different from those which prevail here.

"Some houses in their separate elevations are made up of patches like quilt work, the front being generally all that is aimed at by the tyro designer, while each of the sides of the house are hideous malformations, with no cornices, being brought round from the front or impediment; thus, as it were, dividing the centre from the flanks, instead of binding the whole together, by their proper horizontal lines running round the building.

"A blank window to a house shows poverty of design. In this case a frame and sashes should be put in as if real, plastered, and then painted black; the blank in this case will not be observed.

"Never place a solid over a void—I mean a pier over a window; it is false in principle, and liable to an unequal settlement, by which the window arches are sure to fracture.

"A chimney shaft in the end of the house, directly over a window, will make the window look as if it came through the chimney. The acroter on a pediment or gable is here an exception.

"Never place chimneys in the outer or front walls of a house, as was the practice in the Tudor period; the room will be cheerless and the fireplace inconvenient.

"Do not erect a colonnade or a veranda on the north side of a house, where the sun never shines, its original intention being to keep off the fervent rays of that luminary during summer; it is only applicable to south fronts.

"Do not disfigure the front of a building, where grandeur is required, by too many divisions, for the breaking of one large mass into many small ones destroys all greatness of manner, and impairs in no small degree the general nobleness of effect.

"An elevation of a house much frittered up by little parts destroys grandeur, though it may produce a picturesque effect, for grandeur cannot exist without magnitude.

"Do not mix different styles of architecture together in the same building; it is absurd, and shows a great want of taste. I have sometimes met with a house like this built in the Tudor style externally, while internally it was Grecian.

"Convex friezes to Roman orders, and

to window eaps, are vile, heavy objects, and which appear bursting by the weight of the cornice above.

"Rustic angles to buildings where they are not in character, introduced for mere ornament, are bits of useless finery, and have a tendency to make the whole building look absurd and prison-like. Rustic belongs only to the basements of a more massy Roman stone buildings. Of such modern gew-gaw buildings well might the poet remark :

'And lin'd with bits of rustic makes a front.'

—*Pope's Essay on Taste.*

"Venetian windows to bed-rooms in our climate makes the rooms too cold. These windows should never be placed in any other part than the ground story and in the wings, more particularly for a library or billiard room.

"Country detached villas should never be built more than two stories high, being here much exposed to storms; they would also look inappropriate and out of place.

"Never introduce pilasters of any order in the front of a house without an appropriate entablature on the top, or some office for them to perform more than mere ornaments; this is an absurdity often to be met with in small houses in the country at the angles of the building, and more frequently where the house has an overhanging roof in the Tuscan style.

"Half columns attached to fronts of houses have a very disjointed appearance, particularly that of the Ionic order, as that part of the volute towards the wall always appears cut off. Those columns should be made three-quarters of the circle. The volute adjoining the wall may then be made to appear entire by sinking a groove into the wall around it.

"A pediment with mouldings, partly returning at the lower angles in a horizontal direction, and not continued through in consequence of a window intervening, is bad architecture, as the tie of the roof part is here cut off.

"Open pediments, as they are called, by being divided at the top to receive a bust of some noted personage, is bad in principle, and should never be adopted. It appears as if strength was first aimed at, and afterwards severed, or that the pediment was erected to carry off the water, and then cut open to let it in.

"Sashes with circular heads, and the bars in the Gothic style, is an incongruous mixture, which may frequently be seen in our dwelling houses.

"Sashes with a bar up the middle are very improper, as the bar comes directly in the line of the sight. An unequal number of squares in the width is more consistent. It is a good way in some situations to have the middle squares the largest.

"A pediment over a window or door in a circular-headed recess is useless, as the recess answers the purpose of the pediment, that of keeping off the water from the head of the windows. This absurdity may be seen in the front of Somerset House, towards the strand.

"Never have the piers in a house between each window narrower than the windows themselves, as the house will have a weak appearance.

"Never place the doors or windows too near the angles of the building, for here the greatest strength is required, and the walls at those places are subject to lateral pressure.

"Vases on the top of a dwelling-house are inconsistently placed; they should be used as ornaments along the ground story, and placed on pedestals around a terrace or flight of steps.

"Balls on the top of a house, or on lofty entrance piers, have a terrific appearance; they never look secure. On piers, crests are more appropriate and beautiful.

"In a portico of two columns, always introduce a pilaster opposite each column against the wall. Columns without pilasters, as some builders execute them, appear inconsistent.

"For porticos of more than two col-

umns, never introduce pilasters along the walls opposite each column; it is contrary to order; but only opposite the two end columns.

"Never flute the Doric columns entirely down to the stone step on which they rest, but always have a plain part, as a plinth or bond, and each flute weathered to carry off the water; for when the arris flutes go to the bottom they are liable to be broken off.

"Always let the number of columns to a portico be equal, and never have a pediment over either a door or window within the portico; such is inconsistent; the pediment being originally intended to carry off rain which fell on it; here the windows and doors are protected.

"On all domes let there be a lantern light or skylight kirk on the crown, like St. Paul's. A dome without either looks like a balloon rising, or an egg in a cup. All domes should be raised on a cell or tambour, with a series of circular steps.

"A window with a level head in a recess which has a circular head, should never be carried up higher than the springing of the arch of that recess. If the window is circular-headed, it should spring from the same line as the recess; contrary to this it is erroneous, though frequently to be met with.

"In the metopes of the Roman Doric order, wherever or to whatever use applied, never introduce ox skulls; they are applicable only in the heathen temples of sacrifice. In domestic or Christian edifices for any other purpose they would be an absurd emblem.

"In a design for a building in the Greek character, never have arches of any kind, for the arch was not known to those people, it being long afterwards an invention of the Romans.

"Always have roofs low (unless in Tudor structures); a slanting roof is no beauty to a building, except in the Tudor architecture: here they are generally deemed picturesque by their unequal height and varied interseptions.

"The crown moulding of a cornice in a

pediment over a portico, where it is returned into the building at each side, without continuing the same along the top of the other mouldings of the cornice running round the building, is neither sound nor good architecture.

"Finishing any part of a cornice on the outside of a building with a carved moulding on the top without a projecting band over where it is exposed to the rain is improper, because it soon decays. Such is the case with the abacus on the columns of the Temple of Jupiter Stator at Rome, and which has lately been erected at the new Treasury by the late Sir John Soane.

"Dripping eaves should always be avoided; they are the occasion of decay to the basement of a house, by the frequent falling of rain, injuring and producing the dry rot. This should be prevented by concealed gutters.

"Avoid having the chimney tops appear irregular above the roof; they always look as if no thought had been given to this part of the building, but carried up as chance directed.

"Pediments over a series of pilasters or false or sham porticos, when attached to a building with an attic story above, is unmeaning, and looks like the end of a roof coming through the wall; such an error may be seen in the elevation of Greenwich Hospital, fronting the river Thames."

Each and every one of the foregoing cautions of Professor Brown has a due amount of force even now, and his excellent advice is worthy of attention by all students.

OMISSION.—In the notice of the excellent practical work on detailed architecture, by Cummings & Miller, in our preceding number, we omitted the western address of the publishers. It should read—Published by A. J. Bicknell & Co., Architectural Book Publishers, Springfield, Ill.: Eastern office, Troy, N. Y.

SIR CHRISTOPHER WREN.

THERE is no name on the tablet of eminent English architects which attracts more attention, even here in America, than that of the truly great artist whose genius gave to London its Cathedral of St. Paul, not to speak of the many works which, with esthetic defects, combine such constructive skill as to ensure admiration above all. But, we will not now intrude our judgment where we have already before us that of one of his own countrymen, honest, unshrinking, and comprehensive. The following is from an essay by Mr. G. Wightwick, Architect, to which a medal was awarded by the Royal Institute of British Architects, some ten years ago:

"The creative, as the most essential attribute of genius, was Wren's in a marvellous degree; and, in respect to the universality of his attainments and powers, it may be emphatically remarked, that, had he never been known as an architect, he would have been by so much the more known as a man of scholastic literature, philosophy, and science. Before he comes before us as an architect, he brings the highest credentials from the classic professors of Isis, the mathematicians of Cam, the astronomers, chemists, and scientific members of the Royal Society, and from the mechanic in all his then known means of operation.

"All that Vitruvius requires of an architect was Wren's, without any especial architectural intent; but, as Allan Cunningham observes, 'his mathematical acquirements gave him extensive command over the very principles out of which true architecture arises.' Perhaps we should rather say, had found in his mathematical erudition the chief (or one of the chief) of its principles; for in the varieties of physical science lie others also of great suggestiveness, and the architecture of Wren arose out

of his varied knowledge—his knowledge of all things necessary to its development, as the issue not more of geometrical beauty than of material science and constructive perfection. In short, the genius of Wren had induced the acquirement of every accomplishment as an operative builder before he was called upon to cultivate the artist. He had inherited from his father a peculiar feeling for architecture as a fine art, though for many years it had occasioned little more than the external observation by which he had naturally imbibed an ever-increasing sense of the beautiful, awaiting only the occasion for his analysis of its just principles; and, when the occasion came, a comparatively brief appliance of his acute perception, acquisitional capability, and thoroughly informed invention, was necessary to the result finally exhibited in the august amplitude of St. Paul's cathedral.

"And whence came his ability as an artist? Certainly not from academical or official instruction, for, until the age of twenty-nine, when he was suddenly called upon to assist Sir J. Denham as Assistant Surveyor-General, we hear nothing of him even as an architectural amateur. So immediate, however, was the manifestation of his ability as a practical architect, that at the age of thirty-one he erected his first building, the Sheldon Theatre, at Oxford. The truth is, he was at that time, more than any other man in the kingdom, equal to anything of national importance that might be required; being indeed the 'admirable Crichton,' of mind in its all-applicable power and comprehensive acquirements. The leading mathematicians of Europe had visited England to see the famous Wren: a distinguished classic had spoken of his poetical accomplishments as raising him above

Ben Jonson as a translator of Horace; and, when Newton was a tyro, Wren, with Boyle and Hooke, was opening the way for the former with 'the greatest contributions to science ever yet produced.' The love for architecture, therefore, was only a part of his sympathy for everything that could address a man of genius; and had there been no mathematician of eminence besides himself, nor any remarkable poet, painter, sculptor, astronomer, chemist, optician, or mechanic, Wren would have been all or any of these, as the necessity of the times might have required; but Inigo Jones was dead, and there was no architect. Who, then, could be called upon when the Great Fire of London had left the city with no architecture? Who, save Wren? He had not, like Jones, visited Italy to study its ancient and Palladian buildings, though he did make 'a trip to Paris,' where he thought he saw inimitable things, unconscious, in his modesty, how greatly he was to surpass them. He read his Vitruvius; speedily gathered what knowledge was available, immediately anticipating the results which come to others by slow degrees; and in three years from his first operations as an amateur architect, he had 'concentrated all his powers on his new study, to the diversion of his mind from its former pursuits.' The true character of his genius, as an architect, is strikingly shown in his having adopted no mannerism from his teachers, or from the examples that had addressed him. Having mastered with readiest facility all the details of classic design, he obeyed the sole promptings of his native imagination, fancy, and independent (though educated) taste, in the production of models which, to reverse his own expression, 'Bernini might have been willing to give his skin for;' though, of course, we now allude to the greater and more select examples on which his fame is grounded. * *

"The time prescribed the style to be

adopted. The approval awarded to Inigo Jones's application of Corinthian portico to a Gothic cathedral left it a matter of certainty that the European taste for classic art had no exception in England. While Wren was being rocked in his cradle, the church of St. Peter, at Rome, was being completed; and in Paris the old cathedral of Notre Dame had no more influence than Westminster Abbey, in London, to preserve any feeling whatever for Gothic designs. The Louvre and the church of the Invalids, in the French capital, arose in obedience to the same common impulse which produced the Whitehall banqueting-room and the cathedral of St. Paul in the British metropolis. As we have seen, however, Wren obeyed not the dictates of fashion only, but has left on record his practical reasons for selecting the 'Roman manner of building' as most fitting for the permanent glories of architecture. The time, therefore, was rather favorable to the development of his personal ideas than imperative in governing them, and he adopted at once, without any essential change in detail, the style presented to him by his immediate predecessors and contemporaries. The new cathedral was to be, and Wren's genius was at hand that it might be in perfection; subject only to one most injurious impediment, viz., the unhappy meddling of the papist party (then in power), whose leader (the Duke of York) was determinate in the re-employment of the old cathedral form or plan, which grievously militated against the admirable originality of our architect's independent conceptions. **

"If the architecture of Wren, as illustrated by St. Paul's, be judged with generous allowance for compulsory restriction, the result can be nothing less than deferential admiration.

"And now a few words on the thoughtless cavils that have been raised on the subject of the double dome (we might as well say the tripple dome) of St. Paul's.

"The dome of the Pantheon, at Rome, having nothing but itself to support, is a simple vault of masonry, so low in proportion, and so immensely buttressed, as to be prepared for an earthquake.

"The dome of the Florentine cathedral is so highly pointed as to approximate towards the cone, and it is, therefore, the more fitted to bear the stone lantern at the top.

"The dome of the Baptistery at Pisa is formed of a lofty internal cone, supporting the outer vault or hemispherical covering.

"The non-appliance of constructive knowledge in the dome of St. Peter's, at Rome, was felt before it was finished. The lantern was made less than originally intended; but still it proved too heavy for the great vault that could hardly find safety for itself alone, and it has only been preserved to our wonder by hoops of iron,—the means taken by Wren to secure the safety of Salisbury spire.

"Our scientific architect had marked the failure of the Gothic architects in their deficient regard for lateral thrust. He had observed how fearful might be vertical pressure on a domical vault. Whether he was acquainted with the Florentine and Pisan examples we know not; but if not, he had intuitively the knowledge they would have afforded him.

"He had to place upon the top of his dome a stone lantern, with its ball and cross measuring some 90 feet in height. He therefore adopted the principle of the Pisan Baptistery. He constructed his inner brick cupola of the form and altitude he considered best for internal effect. Over this he built a cone, just free from pressing on his cupola, and he carried it upward till it met the required width for the base of his lantern; finishing his cone with a domed top, as at Pisa. This being determined, the attic story of his tambour arose to press down upon the common

springing of the cupola and cone; and, not to remedy a defect, but, 'to make assurance doubly sure,' he applied his hooping-chains of iron. To protect the cone a roof was necessary, as that which covers the vaulting of his nave and aisles, and of the same material, *i. e.*, wood and lead; the purpose of protection and endurance being precisely the same in both cases. Apart from what Roman design requires—apart from the majesty of the hemispherical form,—is there a man breathing who would cover a circular cell and its cupola-vault with anything but a hemispherical roof, as the best for affording the particular weight of leaded timber upon the buttress of the cone, with means for effectively confining from bulging, either in or out, the masonry of that cone? The high Gothic dome of Florence is not admissible in pure Roman design; but a lantern, ponderous as that at Florence, is required. The simple hemispherical dome will not safely support such a lantern. The Pisan mode of construction suggests the mode of security. So much for mere construction.

"Now for the matter of taste. Is there any reason for such scrupulous honesty, as shall shrink at the idea that the beholder may be deceived in thinking that the ceiling he sees within the building is the mere inside of the shell he sees without? May he not separately think of what is beautiful without and within; and contemplate distinctly the perfection of both, with a comfortable conscience as to the filling of the intervening space, especially when he knows that concealed work is necessary to his admiring in safety? If the spectator, amazed at the dignity of bulk and altitude without, gives to the expanse within the credit of equal size and altitude, is it not better than well? Is it not a fair illustration of the *ars est celare artem*? There is surely no need to be argumentative on this absurd question any longer. In every sense, artistic as well as scientific, the dome

of St. Paul's (so far as the architect is concerned) is the transcendent example of perfection in its kind. Its cupola is the firmamental beauty of the cathedral's interior: its dome is the glory of its extern, and the fitting crown of the metropolis of England. It will be time enough to insist upon it that a church dome shall be simply an inverted cup of masonry, when all the remainder of the building shall have no roof but the vaulting which forms its ceiling.

"The steeple of St. Bride's Church *alone* does not assert the strength of his genius, nor the play of his fancy, so much as his judgment and taste in producing an elegant arrangement of simple and resembling geometrical forms, within an outline of unimprovable grace. In certain other examples, we observe the free pencil of the artist tracing fluent lines of beauty: in this, we see how the rule and compass of the geometrician have rather been in operation, though to a result leaving us to wish for nothing else in its stead. The gradual increase of open-work and decoration, in the ascent of its elevation from the base to the crowning obelisk, is charmingly effected; and, though the spire, like a Chinese pagoda, is little else than a repetition of octagonal chambers successively diminishing in their rise, still the retention of their vertical lines, in concentric progression, so far unites them into an unbroken whole, as to correct the objection which might be (critically) taken to a pile of distinct (though resembling) parts. Let us grant Wren has here aimed at what can only be thoroughly perfected in a Gothic spire: it is enough that the beauty accomplished is proved compatible with Italian details. There is, moreover, this to be said of the Italian steeple, that it admits of a distinct variety peculiar to itself; *i. e.* not only a different but a distinction, as marked as in things of separate kinds. Even when the general outlines of two Italian spires may much resemble each other, this

distinction may be preserved, so as to 'tell' no less in a distant than in a near view; and the advantage of this (pictorially speaking) in a city of many spires must be obvious—to the painter's eye, at least.

"The steeple of Bow Church, Cheapside, is little short of perfection, as an adaptation of Classic detail to a general form, whose vital principle is that continuous verticality which can only be fully carried out in the Pointed style; and it may be truly affirmed, that this principle is displayed with more completeness in the spire of St. Mary-le-bow, than in many Gothic examples of distinguished celebrity, wherein we see a connection of tower and spire, without that combination which, by artistic management, renders the united two a single entirety. Where a steeple has more than one great part, the graduation necessary to complex beauty requires at least three components; and, as in the case of Bow Church, it will be better to have four or five. As in others of Wren's works, the graces of this steeple grow out of, and, as with natural luxuriance, overspread the form perfected by constructive science. The section shows why the elevation is what it is; and the successive plans of each story as truthfully super-impose one above the other, as the ascending parts of the human frame. Not a feature is eccentric: each stage rises from out of its inferior and into its superior, as thought from and thought in the eloquence of a perfect orator. It is true the whole may be taken to pieces; *i. e.* the pieces are separable; but no portion has, distinctively, one-fiftieth part of the beauty of the five collectively,—the basement, the bell-chamber, the circular peri-style, the rectangular composition next above, and the crowning obelisk. These, in their individual and relative forms and proportions, are the felicitous results of as many fresh thoughts co-operating in the development of one idea.

"Though Wren's Pointed architecture cannot (either critically or opprobriously) be called Gothic, we may yet refer to three or four examples having, in their nondescript character, a merit of their own. There is a picturesqueness in the bulk and form of the bell-tower of Christ Church College, Oxford, which we should be loth to change for anything more justified by Gothic precedent; and, in the tower of St. Michael's, Cornhill, we recognize a successful aim at effectiveness, and a feeling for masculine beauty, which are scarcely the less noticeable because expressed in very indifferent grammar or uncertain language; but it is to the steeple of St. Dunstan's-in-the-East that we would especially allude as an example of supreme grace. In the bodily form of its combined features little improvement can be suggested. Supplant the little cappings above the flying buttresses by small pinnacles: apply engaged pinnacles where the square diagonal buttresses of the tower resolve themselves into the angle octagons; then Gothicize the square panellings of the minor horizontal compartments of the tower, and the old example of St. Nicholas, at Newcastle, will be the more favored by noncomparison; for, even as it is, the venerable 'legitimate' would show but indifferently beside his bastard successor.

"In St Dunston's, as in the steeple of St. Mary-le-bow, beauty is the result of taste operating on constructive perfection; nor has the former example any existing rival in simple and elegant delicacy, combined with such an expression of enduring strength. Considered Gothically, this beautiful design has some minor defects, which, however, as Gothic feeling pervades, are injuriously important. Let but the true Gothic artist, by the minimum of required excision and addition, correct these defects, and we should probably have an example of what Wren would have

done as a Goth of our present day. The circumstances of particular times will influence the mode in which genius displays itself; but whatever be the mode, the display should be obvious; and we can only lament the bluntness of the perception which cannot pierce through a partially defective manner, to rest with due admiration on the material excellence that nevertheless exists.

"It has been the purpose of this essay, first, to show that Sir Christopher Wren was a man of *genius* in the full sense of the word, namely, that talent which would have rendered his name famous though he had achieved no architectural celebrity whatever. Secondly, to do justice to the *man*, by considering his architecture under all the circumstances of its production; his lack of especial preparatory study; the sudden call upon him for so vast an amount of occupation, with its ever-attendant responsibilities, and its too frequent mortifying vexations, particularly in the case of the one great building, which is, therefore, the monument of his skill under difficulties, but not the just representative of his unshackled artist feeling. Thirdly, to do justice to his *architecture*, without reference to any consideration but that of the unchanging principles on which everything in art that is lasting (and therefore true) is philosophically founded.

"It is admitted that Wren's fame as an architect would not be exalted by a strictly critical estimate of all the buildings not particularized in the foregoing pages; though there be some, and parts of others, which have merit balancing the absence of it in the rest. But the examples we have noticed sufficiently attest his power on great occasions, the mastery by which he gave importance to those of less import, and the ingenuity with which he made artistic taste and feeling combine with science in certain others which exhibit more especial originality.

"Had we an account of all the circumstances attending the erection of each building, we should probably have rather to sympathize with the architect's vexations than to arraign his taste; but Wren thought too modestly of his own works and too humbly of himself, to care for more than the exercise of his best efforts, under the favorable or unfavorable auspices affecting them; content to abide, without any defensive explanations on his part, the judgment which discriminating criticism would pass on his works as a whole.

"Doubtless the genius of this great architect was influenced by the moral goodness of his character, by its philosophic gravity, and more than all, by its religious equanimity; nor can we but delight in thinking upon Christopher Wren as the supreme exemplar of the Vitruvian model; worthy, in every sense, of his own self-erected mausoleum, and of the noble epitaph by which his son confirmed its dedication."

CANADIAN BOULDER ROCKS.

At the meeting of the Geological Society of London, held on the 28th ult., a communication was read on the Geology and Mineralogy of Hastings county, Canada West, by T. C. Wallbridge, Esq., describing the gold and iron ores. A single boulder near the Shannonville railway station was said to cover an area of about five acres, and to have a thickness of 100 feet.

Prof. Ramsay inquired as to the proof of the existence of so large a boulder as one of five acres in extent. Under ordinary circumstances large boulders fell from higher rocks on to the surface of glaciers beneath, and were by them transported to the places where now found; but the fall of such a mass seemed almost incredible. He suggested that possibly it might be an outlier of the lower laurentian beds. Mr. David Forbes stated that the results of

his own examination of some of the specimens from the gold mines of this district did not quite tally with those recorded in the paper, especially those of the rocks in the neighborhood of the veins. He considered that the gold in Canada was confined to the veins. Mr. Prestwich cited the discovery of a boulder between Stamford and Peterborough, which was at least 400 feet in length, and consisted of a mass of great oolite. Mr. Searles Wood mentioned a boulder of marl in the coast section near Cromer, upwards of 300 yards in length, and sixty feet in height. Mr. Wallbridge, in reply, stated that the rock must have come at least twenty miles from its original home. The surface of the Trenton limestone rock in the neighborhood was striated in the direction of the boulder. There was no evidence of intrusion. The mass was traversed in two or three places by crevices.—*London Colliery Guardian.*

OPENING OF THE SUEZ CANAL.—The programme for the opening of the Suez Canal, on the 17th, 18th, 19th, and 20th November, is now settled. All merchant ships or vessels of war arriving at Port Said or Suez during these days will be allowed to pass through free of all dues. From the 21st, the charge will be according to the terms of the concession, 12 f. (8s.) for every passenger, and for every ton, according to the legal measurement of every flag.

SITE FOR A NEW EXECUTIVE MANSION.—The Washington correspondent of the *Cincinnati Gazette* says—"The President and members of the Cabinet have been looking over the ground to find a site for a new Executive Mansion which can be recommended to Congress, and are understood to be substantially agreed upon a location in the northwestern part of the city."

ARCHITECTURAL ART.

THE doubt sought to be thrown on the claim of our ancient profession to be considered an art, is one which could only have found birth in the weakness of jealousy. To this subject we have referred already, but it is one which we cannot allow to pass with a mere comment. So great is the ignorance with regard to it, that even the journalistic press either ignores it *in toto*, or at most, strains a point occasionally to say something, which something, in most cases, is next to nothing. Painting obtains marked attention. So do painters. None of these gentlemen of the brush can go to the mountains, or the water-side, or in fact anywhere, without having the remarkable movement specially noticed in all the papers which pretend to a certain knowingness in "matters of art."

When do we see architects, however eminent, spoken of in the same manner. There are certain country journals that will sometimes give a crude description of a new local building, which said description is provided by the architect himself, and paid for in a laudatory paragraph. But, that inherent pride which belongs to true art shrinks from such tricks of publicity as this, and, in consequence the modest architect has to let his works speak for themselves, and the taste of the public decide on his merits without the promptings of the press. This, to be sure, is slow recognition, but it is honorable.

Now, as to the claims of architecture to be recognized as an art, but little has been said, for architects themselves have been too reserved on the subject, seeing, perhaps, that they could not receive that fair amount of recognition so liberally, aye, extravagantly, dealt out to the sister arts.

We shall not endeavor to embrace, even in an abridged manner, all the

various bearings under which the word art may be considered; so many necessary distinctions are there to be established on so extensive a subject: but we must distinguish what are called the mechanical arts, from what are called the liberal arts, or the fine arts; and we must make, under this last head, a new division to separate from the other fine arts the art of design. It is to a portion of this art that we shall confine ourselves in the present essay, that is, to the art of architecture. Before doing this, we shall endeavor to give a very short analysis of what constitute the points of criticism common to all the fine arts; or, in other words, of the points of view under which they may be considered.

It appears to us that the art of criticism consists in the power of viewing each art in its proper class; that is to say, as to those particulars which compose its elements, or its special attributes; as to its means or capabilities, or, in other words, as to whatever composes the particular action which each art exercises on our organs and our minds; and lastly, as to its end, that is, with regard to what composes the kind of pleasure or impression it produces upon us, or the wants it is designed to satisfy.

Although all the fine arts are the offspring of one common parent, they do not differ the less in their individual kinds in the powers they possess, and in the ends they are destined to attain. They differ in their kinds, because they have not, in their respective attributes, any direct connection, except that of all depending either on utility or pleasure. They differ in their capabilities or means, because these means are limited by the diversity of the instruments employed, and by the barriers that nature has established between the organs of the body and the faculties of the mind: and they

differ in their ends, which in all is that of pleasing, as much as in the different routes which they ought to follow to attain it, and in the different wants they are intended to supply.

For example, although the pleasure to be derived from harmony exists in the attributes of music as well as in those of architecture, the difference between the means employed in these two arts, and in the exterior organs affected by them, cause no resemblance to be found in the kind of harmony produced: and the reason is, that in the constitution of the individual character of these two arts, the same diversity is found that exists between the sense of hearing and that of sight.

What has been said of the essential nature and suitable means employed in each art, is still more applicable with respect to what forms the end and aim of each.

Thus, there are arts, the principal end of which is to express, to paint, or to excite our passions. The means they employ are the images of things, either immaterial, as in poetry, or material, as in painting. The end of architecture, which only expresses itself in the abstract, is to produce in us impressions resulting from ideas of order, proportion, grandeur, riches, and other like qualities. Poetry, by intellectual means, that is to say, by the interposition of ideas, presents material things to our view: architecture, by the use of material objects, presents to our understanding the most ideal affinities.

We shall not enlarge here on the details and applications of a theory which, even abridged, would form the substance of an entire volume; it will here suffice to show that each art differs in its respective kind, in its means, and in its end. From the several modes of applying this elementary distinction, the theoretic definition of the art of architecture ought to result. Considered in its essence or its first principles, architecture is an art founded on utility, and

it is one which imitates nothing material or positive already existing in nature.

Its parts, relatively, are either evident imitations of nature, or indirectly drawn from natural objects; but, as a whole, it copies no reality; its form is nothing more to the mind than a combination of relative proportions, and of reasons which please the more from their being simply expressed.

Under the head of means, we shall consider that architecture employs two kinds, namely, those of construction, which comprehend all that relates to solidity, durability, execution, &c.; and those of intellect, which tend to produce whatever may please the reason or the taste. This is what constitutes architecture one of the fine arts, or arts of genius. In its end or aim, architecture, partaking of two principles, those of utility and of pleasure has really a double end: the one, independent of the art taken in its popular sense is to form for man, and for the different uses of society, abodes, and shelters, safe, commodious, solid; the other, to supply plans and elevations for the arrangement of materials in such a manner as, by their disposition, their form and combinations, their relation to each other, their proportions, their ornaments, and the agreement of their parts as a whole to gratify the sight, and to produce in the mind a feeling of the harmonies of nature, both in the intellectual and material world.

From this it results that architecture may be defined as a compound art, the offspring of utility and of pleasure; and as such, it ought at once to serve and to please us by the union of those forms which are the most suitable to the exterior wants of man, and those which bear the greatest affinity to mental and intellectual pleasures. This definition, while it embraces the universality of the uses of architecture, and indicates its two-fold principle, likewise shows us the difficulties which the art presents. Obligated to serve us in pleasing us, and

to please in serving us, we see that it is impossible for the natural, technical, moral, or poetical parts of the science to be widely separated.

But what affinity, it may be asked, is there between the forms required by utility in architecture, and the forms whence result the ideas of order and beauty? What analogy is there in the exactions of utility as regards walls, pillars, and roofs, with the proportions, arrangements, and ornaments which constitute harmony and beauty? We agree that ideas of order, symmetry, and concord have their origin in the constitution of our minds; but their application to the art of building is so far from being a necessary consequence of the exercise of that art, that no people but the Greeks have ever carried its application to the point of perfection. Such was the strict connection between the useful and the beautiful among the Greeks, that if we consider their architecture in the useful point of view, it appears to bear the stamp of utility so evidently, that it might be believed the Grecian architects never had pleasure for an object; and if we examine it with respect to beauty, we might be tempted to think that they never took into consideration the laws of necessity and utility. We must own that this happy alliance might never have been formed elsewhere; so rare must be this equal combination of the elements of utility and pleasure, whether in the works of men, or in the organs and qualifications of their authors. It was this latter concord that gave birth to the art of architecture in Greece. From the disunion of these two elements (utility and beauty) sprang more or less alterations in the principles and taste of architects. Causes of which we cannot here give an account, gave the superiority to the ornamental or decorative department; and the system of order, and the fundamental sense of utility upon which ought to repose all the rules of art, were comparatively neglected. Reason was

sacrificed to prejudice. Architects, charmed with the beautiful forms of antiquity, adopted them without considering how they were to be applied; and thus the exquisite concord produced by the union of utility and beauty was destroyed, and the art proportionately debased. Every art ought to have rules, which, without restraining genius, preserve the bounds within which it may be freely exercised; but it should never be forgotten that, unless these rules have a more solid foundation than one based on arbitrary examples and authorities, whether of ancient masters or of a blind routine; and, in short, unless they rest upon a perfect accord between pleasure and utility, their inefficacy ought to bring them into discredit.

HOME-MADE LADDERS.—In making ladders we prefer to use red cedar for the poles, and oak for the rounds. White cedar will answer well, and so will white pine or spruce for poles, and the rounds may be made of many different woods. Dogwood is good, cutting stems of the right size, and the bark may be left on. Hickory does well, if the ladder be kept painted, and not exposed to the weather—otherwise it rots at the ends where inserted in the poles. Cut a straight cedar pole of at least six or eight inches in diameter at the butt, and of the desired length, if such an one can be found. Lay up to season six months or a year, and take care that in drying it does not get a bend. With a little painstaking it may be improved in straightness while seasoning, if not straight. Then shave off the bark and branches with a drawing-knife; cut it of the right length; plane down a strip of three inches wide on opposite sides, and mark it and saw it in two in the middle, lengthways. If well done, we shall have two long, straight, sound, tough, stiff poles. Mark off the points for holes for the rounds alike in each; fourteen inches is a good distance to

have the rounds apart. If the ladder is to be a wide one, the lower rounds should be an inch and a quarter in diameter, and the holes an inch, while the upper rounds need not be more than an inch in diameter. For a ladder fourteen inches between the poles, inch rounds are large enough for the bottom ones, and five-eighths inch for the top. Split and shaved rounds are as good as turned ones, unless one is making a very nice job, when the rounds may be split out and then turned. It is well to make the rounds with a slight shoulder, so that the poles cannot be driven together at all by a fall. This is apt to split them, and if the rounds are simply shaved down to enter the holes, it is imperatively necessary to insert several flat rounds two or two-and-a-half inches wide and three-quarters of an inch thick, having tenons at the end, with strong shoulders, and fitting into mortices. When the ladder is put together, dip the ends of the rounds in paint; set all the rounds in one pole first, then put on the other; and, finally, after sawing off the ends of the rounds, drive hard wood wedges into each alternate round, so as to spread the ends and prevent their drawing out. Wedge the flat ones particularly. With a plane, a drawing-knife and a little sand-paper, the ladder is easily finished, and a good coat of varnish will make it last a long time as good as new.—*American Agriculturist.*

A SENSIBLE YOUNG MAN.—The late Col. Colt was himself a practical mechanic. By his will he left to his nephew an immense fortune. At the time of Colt's death the nephew was learning his trade of machinist in his uncle's shop, working diligently in his overhauls day by day, subject to the same rules as other apprentices. On his uncle's death he became a millionaire; but choosing a guardian to manage his

property, he continued at his labor and faithfully served his apprenticeship. Now as he walks the rooms of his fine house, or drives his handsome team, he has a consciousness that if his riches take to themselves wings and fly away, he is furnished with the means of getting an honest livelihood, and may maké a fortune for himself. He was a greasy mechanic, and is not ashamed of it again. Labor and its accompanying dirt are not dishonorable nor degrading; laziness and its almost necessary evils are disgusting and destroying. Dirty hands and a sense of independence are to be preferred to kid gloves and a consciousness of being a mere drone in the human hive. Tools rust from neglect; wear out from use. Neglect is criminal; use is beneficial. So with man's capabilities—better wear them out than let them rust.

FIRE-PROOF LINING.—At a late meeting of the *Institute*, there was exhibited a new material, which by its remarkable power of non-conduction, presents especial advantages. This was devised and patented by Mr. W. Alford. It consists of a rough *papier maché*, made of old wall-paper, by moistening and compressing it. Its power of resistance to fire was illustrated by a specimen exhibited on this occasion, which had been exposed, as a lining to an iron box, with a wooden one in the centre, to the heat of a brightly burning anthracite fire, for the space of an hour. The material was charred on the outer surface to the depth of about one fourth of an inch, while all the rest, and the box, of course within, was perfectly intact. This substance has been favorably reported upon by many of our safe builders, and seems to be an admirable invention. Any one who has tried to light old wallpaper, has found the impossibility to do so, on which fact this invention securely depends.

FOREIGN ITEMS OF INTEREST.

A STRANGE geological phenomenon caused some excitement lately at Murat, a village situated between the valley of Mont Dore and that of St. James. A civil engineer had caused a rectangular well to be sunk to a depth of 53 metres through a stratum of hard tufa, which covers the primitive formation in that district. At this depth, which is insignificant compared to the shaft of a mine, the heat, nevertheless, became so intense that the workmen had to be relieved at short intervals. Their wooden shoes soon got intolerably warm, and they could not lie down to rest themselves on the hot ground. On the other hand, the appearance of the tufa denoted that the well had nearly reached the granite. The engineer, on leaving the spot for a while, had recommended his men to be very careful during his absence, and to content themselves with removing the rubble, without going further down. One of them, however, in throwing the last shovels-full into the skip, took it into his head to remove with his pickaxe a piece of tufa, about thirty inches in circumference; but no sooner had he done this than he saw the bottom of the hole he had made swell up. At the same time a loud rumbling noise was heard. The men in a fright jumped into the cage and called to be pulled up; but they had barely got to the height of a dozen metres when a thick column of hot water, preceded by a violent report, rose up in the air, projecting huge stones upwards. The water in falling scalded the men grievously. The jet diminished, and the well filled rapidly, the poor fellows succeeding, however, in getting out in time. In the course of ten hours the well had got quite full, and from that time a rivulet of thermal water has been flowing from the spot into the Dordogne. The liquid on arriv-

ing there still retains a temperature of 40 deg. centigrade. Upon analysis it has been found to contain upwards of twenty milligrammes (nearly half a grain) of arseniate of potash per litre, a proportion unheard of before. The Minister of Public Works has sent a commission of engineers to the spot for further investigation.

M. FERDINAND DE LESSEPS, says the *Italie* of Florence, after having connected two seas, is now proposing to create a new one. It appears that some enterprising explorers of Central Africa have put forward the opinion that the Sahara is the bed of an old sea displaced by a convulsion of nature. On the faith of that assertion, M. de Lesseps a little time ago sent some engineers to examine the configuration of the soil, and from the results of their labors has become convinced that the desert in question was at its nearest limit 27 metres below the level of the Red Sea, and that the depression went on increasing towards the interior. He is therefore of opinion that a canal 75 miles in length would suffice to put the Red Sea and the Sahara in communication, restore to the latter its original destination, and create an easy method of intercourse with Central Africa by means of these artificial oceans.

THE London *Daily News* discusses the different modes of crossing the Straits of Dover. "The scheme of a tunnel is feasible; but the cost—£10,000,000—puts it out of the question. It has been calculated that to make such a line pay it would be necessary to have about 20,000 passengers a day, making the journey between France and England at a cost of five shillings a head; and this, too, in face of the competition of the steamboats, which could easily be made very formida-

ble. There are only two other plans seriously mooted. One is that of a tubular railway sunk in the sea. Of this, one can say nothing till the project is more matured. But one wonders much why the simplest and cheapest of all the schemes makes such little way. The little boats now in use are a disgrace to us. We ought to have large vessels in which a whole train might be shunted, and in which passengers might have comfortable accommodation, no matter what the weather. The difficulty lies on the Calais side of the Channel, where the harbor is insufficient. If we could have such a pier on the French side of the Channel as we have at Dover we could then place large steamers on the line, but we cannot till then."

A GENTLEMAN connected with the work of the Hoosac Tunnel—next to Mount Cenis the most extensive of its kind ever projected—says that, under the new arrangements, the work is proceeding in a manner perfectly satisfactory to all concerned. About four hundred men—many of them experienced Cornish miners—are employed on the blasting operations, which are effected by means of nitro-glycerine. Their operations carried on at both ends of the tunnel, at the centre of which a shaft is now being sunk through the mountain to the depth of over a thousand feet, which will admit of the working of a third party to meet the others in both directions. Some trouble was lately experienced with the Cornish miners, who struck for an increase of wages, but by the firmness of the managers, the mutiny was quickly suppressed and the men have returned to their work.

THE grand statue of David, by Michael Angelo, is soon to be removed from the Piazza Signoria, at Florence, to some place under cover, a step rendered necessary by the rapid internal decay of the marble. The great hall of the Pretorio will, it is probable, be

honored by giving shelter to this the earliest triumph of Buonarroti's chisel. The Florentine sculptors of whom the Art Commission and the Minister of Public Instructions has taken counsel in the matter, and who is to superintend the removal, recommend that an exact copy, also in white marble, should as soon as possible be made, and occupy the pedestal to be vacated by the great original.

THE *Courrier d'Orient* states that, by the labor of Midhat Pacha, a palace has been discovered beneath the ruins of Ancient Babylon filled with archæological treasures. Among the most curious objects is a library built of bricks of extraordinary composition. The characters with which these bricks, or rather pages, are covered, are in a perfect state of preservation.

A STATUE of Goethe is to be inaugurated at Munich in the early part of this month. On this occasion three productions of the illustrious poet will be given, either at the Court Theatre or at the National Theatre—"Iphigenia in Tauris," "Torquato Tasso," and "Faust."

A DISCOVERY has been made at Herculaneum of two gold brooches of moderate size still fastened to two pieces of stuff. They probably served as the clasp for a peplum. A small faun was also found—an indifferent copy of a very valuable original.

THE preparations for the Œcumenical Council are being rapidly carried on at Rome; and the nave of St. Peter's, where the debates are to take place, has been magnificently fitted up as a council chamber.

THE Russian National Museum at Sebastopol is to be opened on the 15th of next month by General Todleben, president of the institution. The collection of Russian and foreign objects is going on.

CORRESPONDENCE.

It must be distinctly understood that we do not hold ourselves accountable for the opinions of correspondents.

SIR:—I have noticed lately an article in the REVIEW recommending the use of American drawing instruments.

You can oblige a number of subscribers, by informing us where the best can be obtained—through the columns of the REVIEW or by letter.

Yours respectfully,

DRAUGHTSMAN.

Cleveland, O., June 24th, 1869.

Philadelphia has the name of manufacturing the best instruments, and we believe it is unquestionable. The principal makers are JAMES W. QUEEN & Co., 924 Chestnut street, and WILLIAM Y. McALLISTER, 728 Chestnut street.

The perfection to which drawing instruments made here has been carried renders them most desirable to every good draughtsman.

MR. EDITOR:—In putting this article before your readers, it seems necessary to make a conditional apology, as it will be impossible to explain my subject without intruding into the domain of politics; but I will only beg of your readers to not confound politics with partisanship. All observing men have noticed the great difference between the artisan and laborer of to-day and the same class in 1860. We were then just on the threshold of a gigantic war, when the industry of the country was about being taxed to its utmost to produce the materials for offensive and defensive operations. In the four years following, the producing classes furnished not only two millions of men, but also furnished (after the abstraction of this number of men from their ranks) most of the materials of offensive warfare. They supported this immense number of men—not only as non-producers, but

as wasteful consumers. Two millions of men, engaged in active war, will consume double the quantity of food and clothing that the same number would if engaged in peaceful occupation—thus not only requiring the operatives of the country to supply the ordinary wants of the people, but also the extraordinary wants of the waste of war. Every dollar of positive wealth in the world is the product of labor, and if a whole community is industrious and engaged in lucrative production, according to their adaptation, such a community must get rich at the expense of a less industrious neighbor. In abstracting two millions of men from the producing classes for warlike purposes we lose the value of their labor—which at one dollar and fifty cents per day would be three millions of dollars per day, or in round numbers nine hundred millions per year, which for four years would amount to thirty-six hundred millions of dollars. By adding the indebtedness of the country to the amount of cash expended during these four years we have about three thousand millions of dollars, which balances the national books, and shows our loss in dollars—saying nothing about the consequential loss. The first consequence of the war was the increase of wages. The next was indulgence in extravagant habits, which created an indisposition to hard labor, and the consequent loss of time. Then followed a general laziness (I cannot call it by any other name); that is, workmen in all branches, either from neglect or disinclination, did twenty-five per cent. less work in a day than they formerly did. So apparent was this fact, that it was the universal complaint of employers, that the higher the wages the less work was done. This laziness permeated all

classes, even to our household servants, and it appears to be established as a permanency.

"*Like master like man,*" is a trite proverb, and the employers, during four years, from 1861 to 1865, made money easily, and indulged in prodigal extravagance. Their workmen imitated them. When we wish to find fault with the producing classes for extravagance, we must bear in mind that we set them the example. "*Let him who is without sin throw the first stone.*" The industry of the country is now fearfully taxed to pay interest on debts contracted to conduct the war. Including the national debt, the increased debt of the several States, the county, township, and city debts, and the debts of corporations, we must certainly aggregate five thousand millions of dollars. Every dollar of the interest to be paid must be earned by somebody's labor. Thus every workman, in any capacity, must not only earn enough wages to support his family, but must pay his proportion of the taxes. If ten dollars per week would have sufficed a man for his family support, when the country was out of debt, it will now require twenty dollars per week to live as well as he formerly did. In addition to this, we must bear in mind that the gold value of products is much greater now than it was in 1861. In addition to this, also, we must allow something for indulgence in extravagant habits contracted since that time. We may moralize all we please about extravagance, but one fact is worth forty sermons. We all know that it is the easiest thing in the world to contract extravagant habits, and the hardest thing in the world to restrain from indulgence in them. Now, as disinclination to hard work, and inclination to extravagant habits seem to be fixed incumbrances, as a ground-rent or mortgage on the wages of the workman, we must make our calculation for the future accordingly. If we ask the artisan for a reduction in wages, he will say

that he cannot support his family on less than he is getting, as house rent is high, food is dear, clothing also dear, so is fuel, and in addition to all this he must dress his wife and children better than he formerly did, as every body dresses better now. This is his answer; and the farmer will tell you that labor is high, and taxes high, living is high, and he cannot afford to sell his produce any lower. The landlord in answer to any demands for abatement in rent will maintain by proof that the present rental will not purchase as much comforts for his family as he could get in 1861 for the rents received then. Thus the workman cannot work for less wages, whilst rent and living are so dear. The farmer cannot sell his produce any cheaper while labor is so high. The landlord cannot reduce the rent of his houses, because the farmer wants so much for his produce, and the workman demands such high wages. Here is a dead lock. What are we to do?—stay as we are, or drop together! Money, which is the key to unlock every thing but the grave, is unable to give relief; as the money lender cannot afford to lend his money at a low rate of interest, for the same reason that the landlord cannot reduce his rents. In the meantime three hundred million dollars must be earned every year by the laboring classes, to pay interest, independent of the amount required to administer the affairs of the nation, the States, cities, counties, townships, and corporations; every dollar of which can only be produced by some one's labor. The laborer to produce this must have nominally high wages to enable him to live. The consequence is that our domestic products cost so much that foreigners can send their goods in at little over one half the price that ours cost. This compels us to levy high protective duties to keep foreign goods out of competition. Is this to continue forever, or will it come to a violent end? There is no use in shirking this question. We may

as well look it in the face now as to have it forced on our notice at some future time, when we may not be so well prepared for it. Every one is trying to make the most out of his capital that he can. The banker is getting the best interest he can for his money. The manufacturers and farmers the best price they can for their products. The landlord the highest rent he can for his property, and the professional man the highest pay he can for his services. The laborer's and artisan's capital in trade is their muscle, and we may rest assured they will make the most they can out of their capital. We, therefore, may as well prepare for the conflict between those who earn the interest and those who receive the interest—no matter from what kind of property or estate such interest may be derived. Why is it that we are not building ships and steamboats, factories and foundries? Why is it that capital avoids the ways of manufactures, commerce, and other legitimate business? Is it because more return can be had from stock speculations and usurious interest transactions? I will unhesitatingly answer, Yes. There is no confidence in the future, and capitalists prefer lending their money on collaterals to engaging in productive industry. The great fear as well as the great desire is that the price of labor will come down, and with it the value of all domestic products, and all kinds of real estate. The national and other bonds call for so many dollars, and no matter what may be the depreciation in the value of all materials or products of industry, from which the money to pay interest is derived—the terrible fact exists that so many dollars must be paid. A great many of our best business men advocate contraction of currency so as to bring us nearer to specie values. No doubt they are sincere, and base their theories on past experience. Let us examine this result and measure the consequences. If we could resume specie payments to-mor-

row, what would be the advantage? We would advance the value of our national and other debts, making both principal and the interest thirty-five per cent. harder to pay, taking our circumstances as they now stand. But we must bear in mind that by bringing every thing down to a specie basis we depreciate the materials from which the means to pay our debts is derived, thirty-five per cent. in value. This would necessarily require a greater rate of taxation on the diminished value of property to meet interest and expenses of government. Our past experience forbids the possible hope of a reduction in the aggregate required for this purpose. We, therefore, cannot calculate on a corresponding reduction in expenses, other than interest, which always remains the same. A close calculation of above results will show that we would increase—by specie payments—our burden of taxation to nearly double its present rate, or, if you please, it would be nearly twice as hard to earn the money to pay it. Even if we were to return to specie payment, does any one suppose that the price of labor would be correspondingly reduced. If they do they will be woefully mistaken. The signs of the times indicate that the labor of the world is organizing for just the contrary purpose. I do not look forward to any great reduction of wages under any circumstances; nor would I desire it, as it is a well-known fact, that although American mechanics get nominally high wages, compared with European workmen, they do on an average thirty per cent. more work in a day, thus in some measure equalizing the cost of production. With the present price of labor, and the probability of its remaining at this rate, and the price of lumber which is becoming more scarce—persons wishing to build property need not be alarmed at the probability of depreciation in value. In regard to the currency question, I am prepared to say that "*A hair off the dog that bit us*"

would be the best remedy. That is an issue of five hundred millions of greenbacks would be immediately absorbed by the country, North and South, and would infuse vitality into all business, and render the currency so voluminous that clique combinations could not lock it up to the disadvantage of all business interests. Suppose it would lead to an inflation—so much the better—we could pay our taxes the easier. We cannot make business any worse than it has been this year, and if there is any change from our *Micauber*-like position, it must be for the better. Persons with fixed incomes would suffer as they have for the past six years, and those who have large incomes from bonds and stocks would have plenty, even in inflated times.

GEO. J. HENKEL.

Philadelphia, Aug. 12th, 1869.

SIR:—I have read with pleasure your observations on "Awnings," and like your proposition to replace the present unsightly and uncomfortable canvas things with permanent coverings of ground-glass. It appears to me very wonderful that this matter has not been taken in hand long ere this. The present system of "awnings" is simply barbarous. In a very short time it is a thing of shreds and rags, and at its best it is dangerous. Gentlemen who smoke segars, and occupy front offices up stairs, are but too apt to fling the burning remnant, or "old soldier," out of the window. It alights on the canvas awning, and in due course sets it on fire; the burning flakes fall upon the dry goods placed for show on the sidewalk, and the fire is at once communicated to the store, and all is ablaze before the engines can possibly be on hand. Now, this may be considered a wild fancy picture; but to my knowledge, it has happened just so, and may happen so again at any moment; for gents will smoke and be careless as to the direc-

tion their discarded "weed" may take when flung to the four winds of heaven.

There are many probabilities as to the communication of fire to premises by the burning of awnings. The hollow wooden cornice over the store, the trimmings and signs, the wooden window-framing above, etc., and the greatest source of wonder to me is that the insurance offices should fail to see the risk. O! by all means let us have ground-glass awnings, set in ornamental iron frames, and elegance of design will soon display itself on this new and beautiful feature of our street architecture.

CIVIS.

New York, Aug. 6th, 1869.

MR. EDITOR—In the August number of your very interesting monthly, I read, with great satisfaction, a sound, practical paper on "Fire-proof Construction in Iron," by Mr. WIGHT, of New York, a member of the Institute of American Architects.

In the essay alluded to, I found very much that was worthy of deep consideration, and as I purpose at some future time to ventilate my ideas with reference to some of the topics the talented author has so ably handled, I shall now confine myself to one which must have attracted the attention of your thinking readers.

Mr. WIGHT truly says: "Obviously the cheapest material for wall covering in natural materials would be slabs of white marble."

Here is a suggestion for a beautiful reform in our antiquated mode of *lath and plaster* for interior finish, which, for elegance of appearance, would be so far superior to the latter; and which to meet too many people's ideas of beauty would be likewise comparatively economical. Mr. W. says:—"Let us then make some comparison of figures, and see what can be done with this material. Iron lath, of the form generally used

costs nine cents per foot. A responsible dealer in marble informs me that he will put up inch slabs of Italian veined or Vermont marble for one dollar and a half per foot. Which, then, would you choose, polished marble at \$1.50, or plaster, as good in appearance as that in any tenement house, at \$1.34?"

I should say the answer is obvious. Plaster grows dirty, and cracks in time, requiring wall-papering, and even this requires to be repeated. Now, add the cost of this wall-papering, or say oil-painting, to this estimate of plastering, and the marble will have the clear advantage over it; for all this beautiful material will require will be occasional washing.

Using colored marble for base and cornice, and white or gray for panels, what could be more effective? Not to speak of the advantage which in Mr. WIGHT's excellent essay is claimed as paramount, the marble being *fire-proof*.

Purposing to write again, and apologizing for thus intruding on your valuable space.

I am, respectfully,

R. V. T.

Boston, Mass.

Agreeing with our correspondent in his opinion of Mr. WIGHT's valuable essay, we would feel inclined to favor the suggestion he calls particular attention to; but we must say, that, however beautiful, or even comparatively economical as well as fire-proof, marble wall-facing, for interior finish, might be, the *coldness* of that material must prove an insuperable obstacle to its use as a finish for the interiors of our dwellings. In summer this peculiar property of marble would, it is true, be most desirable; but in winter the very effort to heat an apartment lined with it would produce condensation, discomfort, and unhealthiness.

QUERIES AND RESPONSES.

C. R.—Chinese architecture might be judiciously used in the Southern States; but would be quite out of place in the colder parts of the Union. It has been long in use for summer-houses, fancy bridges, and music-temples, in parks and ornamental gardens. But, for domestic use it is not so desirable. However, the close proximity of the Celestial Empire with this Great Republic, through the affiliating bonds of the great Pacific Railroad, will probably lead to the adoption of features which at present have no charm for our "outer barbarian" eye.

L. B. asks if there is any probability of the National Capitol being removed to St. Louis?

We should hope not. For, although the great expansion of the Union has raised a demand for a more central loca-

tion than Washington is, yet the question of economy must be listened to in view of our National Debt; and the deserting fifty millions worth of builded public property to go West and expend twice that sum, would stamp us *fools* in the eyes of the world, if not in our own. No! better to pay the extra travel of a handful of M. C.'s to Washington than to make so vast a change as that.

NEMO.—It is reported that Mr. Astor has promised to finish the Washington Testimonial, or Monument, or whatever it may be called.

BEGINNER.—Be of good courage, the difficulties you speak of diminish as you advance towards them, provided you have perseverance enough to read and digest.

S. T., Binghampton, N. Y.—Another receipt for the removal of writing ink from paper is solutions, respectively, of cyanide of potassium and of oxalic acid, put on with two camel's-hair brushes. But there is an ink called *violet ink*, now coming into very general use, which it is difficult to remove even with those. Ink made from pokeberry is very tenacious. To remove old India ink lines, the steam of a tea-kettle should be let on to the back of the drawing, and then sponge the surface well; when it is thoroughly saturated work the sponge well on it until the lines disappear.

ENGINEER, N. J.—The use of common lime with cement, *if in proper proportion*, as we have more than once said, will be no detriment to the *béton*, but on the contrary serve to strengthen it.

T. M. H.—You will find the Patent Metal an excellent article.

O. F., Cincinnati.—The most filthy cistern may be purified by a single pint of solution of permanganate of potassa to every thirty-six gallons capacity of your cistern. Rinse well a few moments, then pour in water. Draw off, and finally rinse with pure water.

PUBLICATIONS.

GEOLOGICAL SURVEY OF ILLINOIS.—A. H. WORTHEN, Director. This is the third volume of a very fine State work, published by the authority of the Legislature of Illinois. It is splendidly illustrated on steel, and has topographical maps of great value and interest. The reports are full and lucid; and, whether viewed as a rich compilation of most useful knowledge, an elegant specimen of art, or a choice book fitted to grace any library, we think that Illinois may well be proud of it.

THE HORTICULTURIST.—HENRY T. WILLIAMS, Editor and Proprietor, New York. The July number, accompanied by those of the previous months of the current year. In a field of elegant rivalry, the admirably edited and choicely illustrated serial before us has proved itself a well-chosen champion of a charming specialty; and as fruits and flowers are the natural allies of domestic architecture, it shall be our pleasing duty to cull occasionally from its tasteful pages, or transplant a happy thought to embellish our own.

THE GARDENER'S MONTHLY.—Edited by THOMAS MEEHAN, Philadelphia. This is another fruitful claimant on our special notice, and one whose long-time service has given it a well-earned position as a monthly monitor. In the number for August, we find a well written paper entitled "*The Palaces of America*," by FRANK J. SCOTT. The palaces he alludes to are those which shelter and cultivate the growing mind of our Great Republic; which should be right royal residences, and well worthy the boundless liberality of a self-governing people. Architecture and Education are akin, and that which favors the one upholds the other.

THE LAND OWNER.—Chicago, in this admirable Real Estate Journal, gives us another proof of her metal. It cannot be wondered at that the Empire City of the West should rapidly outgrow all its cotemporaries when such dashing ventures as this before us are put forth to attract the attention of capital. Our Eastern men have hitherto troubled themselves very little as to the claims of Western cities on their notice. They have all along nursed an idea unworthy of an intelligent commercial people, namely, that those cities of St. Louis, Chicago, and Cincinnati, were merely large country towns, calculated to excite the wonder of those only who were

remote from the great Eastern Emporiums. The growing truth, however, has begun to force itself upon their awakening imagination, and a glance over the interesting pages of this illustrated serial cannot fail to teach them that it is not merely an oratorical fiction, this Great West!

The topography is clearly and attractively illustrated in well-printed maps, which are most erroneously entitled "Cartoons." The subscription price is \$3.00 per annum, which to every man interested in real estate traffic must prove reasonable, especially when the *Land Owner* is once seen.

REYNOLD'S TURBINE WATER WHEELS.—The tiny gem of typography sent us describes in a plain and interesting manner the action and power of these hydraulic engines, which are attracting so much attention. The introduction of this mode of raising water to supply dwellings in the country has conferred a great boon on society, and it is not wonderful that the competition in the trade should run so high where the article is so very popular.

LEFFEL'S DOUBLE TURBINE WHEEL.—We have also received a descriptive pamphlet of this admirable Ohio turbine, the invention of a mechanical genius of no common ability, and one who has constructed some of the best wheels in the country. The pamphlet is a large octavo of over 100 pages, is lucidly written and well illustrated.

EARTH CLOSETS.—GEO. G. WARING, Jr.—This is a 45 page pamphlet, description and recommendation of an article which is steadily forcing itself on the attention of the public. It fully and forcibly advocates the advantages possessed by this recent rival of the water-closet, and shows that utility, economy, and inoffensiveness are its indubitable claims to universal patronage. It also gives instructions by which any one of ordinary mechanical capacity can make one of these apparatus. But, of course, the best plan is to buy those already manufactured, as they are made in the completest manner, at reasonable prices, an extensive supply being on exhibition in this city and New York. This little book is well worthy the perusal asked for it, and, falling into the hands of our country friends, cannot fail of making patrons for the Earth Closet.

THE
ARCHITECTURAL REVIEW
AND
AMERICAN
BUILDERS' JOURNAL.

MONTHLY REVIEW.

EDUCATIONAL REFORM.

IN what has hitherto been known as collegiate education in this country, as well as in Europe, we have always looked for an acquirement of dead languages called "classics", and deeper science, comprehending in its clammy grasp the ethics of a decomposed heathen theology. All that was abstruse, and a great deal that was utterly worthless, was garnered up in our universities to be solemnly portioned out to the student worshippers of Minerva and the wise-eyed owl, in order to fit those young persons for either of the three professions (the mystical three) of the pulpit, the bar, or the scalpel. Outside of this equilateral tri-angle all was mere "trade," and nothing more. There were but three professions, and young men who aspire to lead in society, sought out one or the other of these as a shrine on which to dedicate his brains, and acquire respectability. The cabalistic letters D.D., A.M. or M.D. (not to speak of the overwhelming LL.D.) were spell enough, without one other consonant, to inflate a name, if not to influence a world! But expansion is a developing process; and as time has its influence in producing it, so we now find that the consequence of the growth of observation has become so uncontrollable by the limits of the past, that mind is beginning to join

issue with common sense, and before this coalition, exclusiveness must give way and let the wave roll on.

In our higher schools and universities of to-day, the cob-webs of ancient lore have been swept aside to let in light upon practical philosophy, and learning begins to be a thing of reality, a suggestive monitor, watchful of the future, rather than conservative of the past.

In all our colleges there will some day be a professor's chair of Architecture as well as one of Engineering, and our universities will yet confer degrees commensurate with the capability of the recipients, and which degrees the public will learn to have confidence in. Boston has already made the first move in this matter by the appointment of Mr. WARE to the Professorship of Architecture in the Massachusetts Institute of Technology. Mr. W. is a gentleman of liberal education and an efficient member of our profession, a Fellow of the Institute of American Architects, and one in every way well calculated to be the pioneer in the advance of our position. The Cornell University is a very desirable improvement on the ways of old, and will doubtless usher in a more general reform still.

Until such events shall become matters of course, we need not expect that

Architecture will in this country attain that position amongst the liberal professions which it is eminently deserving of, and that we may ensure the wished for season of success, it becomes us to prepare to take position and sustain the name we claim with justifiable pride as ours.

The overbearing assumption which some egotistical monopolizers of architectural knowledge display, will scarcely avail in a fair field of honorable training; for modest talent will then and there assert and hold its own. In order to gain the point we have in view, it is very evident that association is requisite, and without it our individual efforts will not advance us beyond the stand we now occupy. "Every man for himself" is at best but a feeble maxim, and one which will never sustain or forward a principle, however intrinsically good.

The INSTITUTE OF AMERICAN ARCHITECTS is the entering wedge in the reform movement so necessary to our profession's welfare, as well as to the full acknowledgment of its claim to distinction as a higher art. That association of the ardent and active promoters of this cause of improvement and development has been at work for some years under adverse or at least dispiriting circumstances, not the least of which is apathy arising from jealousy on the part of the main body of the profession. Yet the INSTITUTE is not alone existing, but more likely to prosper than ever. And why should it not? Can a body have life and activity and have no head? The members of the profession who think that they (each and every one) constitute the Architectural genius of the community, and desire no contamination with the Institute, had better open their eyes in time and throw aside illiberal ideas, manfully acknowledging themselves as only students in the great art, and willing to take and impart instruction for the good of the general cause. This would be noble and worthy of true genius. There is a very

mistaken impression spread abroad that the INSTITUTE OF AMERICAN ARCHITECTS is an exclusive cable got up to subserve certain interests; in fact nothing more nor less than a *petitcoterie*, conservative and aristocratic in its purpose. But, such is very far from the truth. Any architect of respectability can easily find admission, provided he will but agree to the terms of membership, which are nothing more nor less than any honorable man would feel himself bound by, whether a member of any society or not. In fact the very interest of the profession is to bind each other in one common accepted pledge for the general weal, and if, in addition, there be an interchange of ideas and experience amongst them, as is the case with Medical and Law Societies, so much the better for the profession and its individual members.

O, that we could see the petty, unworthy bitternesses, which cause so much contempt in the public mind towards us to-day, once and for ever laid aside, and the architects of America rally with one heart to the upholding of our noble profession, and thus perfecting an Institute that would be a pride to our own, and a boon to succeeding generations.

The pressure which might be brought to bear upon the great question of EDUCATIONAL REFORM in favor of the admission of ARCHITECTURE as a theoretical study in our schools, colleges, and universities, ought surely to call forth the energy and good feeling of every professor of the art, and draw them all to one common head, for combined usefulness.

AMONG the recent discoveries at Herculaneum in the excavation of the ancient city, are fourteen vases of different sizes—a candelabrum, a lamp, several dishes of glass and burnt earth, the marble statuette of a Fawn, and two broken tables, one of marble and the other of slate.

BATHS FOR THE PEOPLE.

THE pressure on this subject becomes greater. The summer heat we have just experienced, as well as that which we will in future years experience, must sooner or later, urge this subject to a crisis. Why shall the people suffer for want of public baths? Public drinking fountains we are at last, thanks alone to private benevolence, obtaining; and blessing and blessed are the donors. We hear even that a worthy citizen has determined erecting a free bathing-house for public use on the banks of the Schuylkill. He is indeed a benefactor, and thus builds a monument of gratitude to his name which will endure as long as there are hearts to feel for kindnesses conferred.

But, what is our municipal body about? This is their business, and they should know it, if they can but realize the fact that they are the elected custodians of the city's welfare, and that it is not in political efflorescence alone that such welfare exists. How many lavish appropriations are made yearly by them for matters of utter insignificance as compared with this of free bathing resorts for the people. They are ready enough to enact stringent ordinances against the indecency of the public bathing in our open rivers; and the police are dutifully active in bringing small children to justice for their wicked infringement of a by-law they could not read or perhaps understand, if they heard it read.

Now this action and inaction of our municipal council are both of them simply tyrannical. First, it is tyrannical to withhold the money necessary for the construction of public baths as a sanitary institution, because the people have an unquestionable right to the beneficial appropriation of their money, and healthfulness being the thing of chief importance, no more beneficial use can be made of it than the application

of a reasonable portion for public baths. Secondly, the interdiction of public bathing in either of the broad rivers that invite that cleanly practice, by authorities who at the same time have the power of instituting fitting places for that purpose, but will not use it, is clearly tyrannical and only worthy of an *effete* European despotism.

It is surely time that the community should awaken to their interest in this matter, and that the municipal authorities be peremptorily instructed to see that any of those little insinuating leakages in the fiscal affairs of the city should be at least contracted, were it only to secure so desirable an object as free public baths, even at the risk of the indignation of some dozen cashiered hangers-on of the party happening to be in power when this event shall be happily consummated.

It is not in summer alone that public bathing places are needed; they are a necessity all the year round. Hence, it will not answer the present demand for them, to anchor old worn-out boats in the river as has been the custom in New York by speculators. No, we want architectural structures, permanent institutions which will be no disgrace to our taste in design, and which will ally elegance with comfort and convenience. The several railroad companies go to immense expense in the erection of their city depots, which they strive to make worthy of their patrons, the public, as well as creditable to their own character as companies. Is not a municipal council as much interested in the public welfare as a railroad company? In the one instance the public pays *fare*, in the other the public pays *tax*. Now, as both these terms mean money, have not the public a right to expect attention to their wants and comforts as much from the one as from the other?

In fact the railroad being a private corporation is not as responsible as the municipal councils, which are elected to office by the public at large. Yet the simple subject of accommodation is treated with the utmost illiberality, at least in the matter of public baths, by the public's own people, despite the glaring contrast with the private companies alluded to.

This is altogether unwarrantable and should be thoroughly reformed. The citizens, representatives should see to the citizens' wants, and supply what is

demand of them. The public health requires, as a sanitary guard, this institution of public baths, and it is not becoming in that body which possesses the power of doing so much good to neglect a serious duty, such as that of affording a proper means of preserving the health and cleanliness of a city of over eight hundred thousand inhabitants. We will hail with pleasuer the name of that member of either council who is first to move in this matter, and we think we are safe in predicting consequent popularity for him.

SELECTION OF BUILDING STONE.

IN the September issue of the REVIEW we gave our readers an extract from the able and exhaustive report of PROFESSOR JAMES HALL to the New York Capitol Commission with reference to the best stone to be used in the building of the new State House at Albany.

On a former occasion we spoke of the necessity of a knowledge of geology to architects as well as engineers, and we now repeat that opinion most emphatically. It is as absolutely incumbent on a man who has committed to his charge the construction of a building, intended to be permanent, that he should be perfectly conversant with the history, nature, and capability of the stone he is about to use, as that he should know the cementing power of the material which is to hold it in place. That there has been a melancholy want of knowledge on this subject, is but too painfully evidenced in the exfoliated faces of stone buildings erected at a comparatively recent period throughout the country, and it is a fact which cannot be denied that in the great majority of cases, where the stone preserved its integrity in buildings, the architect had good fortune to thank, rather than his own knowledge or skill in the selection of the trusted material.

Why is this most requisite branch of

our young architect's education so utterly neglected that when, in future years, involved in busy practice and not having had the opportunity of such study in earlier days, he should be forced to accept the crude hints or ignorant recommendations he receives from others, in most cases interested in his selection of their peculiar material?

We want light in this country, practical light on this subject of geology; not light borrowed from European sources, but direct light coming from our native geologists who derive their information from the American quarries and teach of them understandingly.

Professor JAMES HALL's report is a most decided evidence of the truth of our statement that there is a woeful lack of knowledge amongst architects on this great subject; and it likewise proves that with such practically informed men as he, in our midst, there is no reason why the ignorance complained of should longer exist.

We want light—and here we have one, at least, fully capable of giving us this required light. Drawing on the rich treasures of his acquirements, how easily could such a man, or men, furnish our profession with the actual knowledge we want, unencumbered with the fossil technicalities which so often

go far towards stuffing books proposing to be practically instructive, and actually deterring students in Architecture from venturing on a theme apparently so beset with difficulties.

To no other professions than Architecture and Engineering is the study of geology practically useful. Then why not have hand-books in it such as would be fully and entirely useful?

Even in the necessarily limited extracts which we present to our readers there will be found information which is invaluable to the architect and the builder, but which gives at the same time only enough to make those concerned long for more.

Professor JAMES HALL says:

"In the selection of building stones for the exterior walls of a building, *color*, *texture* and *durability* are objects of the first importance; and all of these ought to be combined, to render the structure perfect. Too little attention has been given to the subject of building stones; and while on the one hand we are largely using a brown stone, which gives a sombre cheerless aspect to the structure, the opposite extreme has been sought in the white marble, or that which is more nearly white in color. In contrast with these, we have the red glaring color of brick; and it is only partially that this offensive aspect is palliated by painting of neutral tints. In a few eastern cities and towns we find the light gray granites now used in preference to the brown freestone, the white marble, or the dark granite which have been much in use in past years.

"No one can fail to experience the sensation of relief afforded by the structures of light colored granites in the city of Boston, or those of the buff or dove colored limestone in the city of Chicago, or of the light gray freestone of many buildings in Cleveland and other places, and of the buff colored brick of Milwaukee. In these cases we have not the excessive reflection of light, or the glare which comes from white buildings

whether of marble or of painted brick; nor the sombre cheerless expression of the darker stone caused by its great absorption of light. It is only necessary to consider the effects produced by the structures of these different materials upon one's own sensations, in order to determine what are the most agreeable tints, or those which please the eye and produce a cheerful impression upon the mind.

"In the majority of structures, the necessities of locality, cheapness, or other causes compel the erection of structures from materials most accessible; but these considerations are not imperative in the case of an important public building.

"In many cases where the rock is homogeneous throughout and the color uniform and satisfactory, it is only to be inquired whether the coloring material is such as will produce decay or disintegration of the particles. When the general color is produced by the aggregation of different materials of distinct coloration, the character of each one is to be considered, and its effect upon the whole; and it is important to have such material comparatively fine-grained, and the different parts as uniformly mingled together as possible. As a general rule, it is only in the darker stones that the coloring matter has any tendency to disintegrate the mass.

"In the selection of building stones, the simple presentation of a sample is not enough. The rock in place should be examined in the outset; for in its natural outcrops it has been exposed to the action of the weather, in all its influences, for many thousands of years. One of the principles taught in elementary geology is that the soft and decomposing rocks appear in low rounded or flattened exposures, or entirely covered by the soil or their own debris, forming no conspicuous feature in the country; while on the contrary the harder rocks stand out in relief, producing marked and distinguishing features in the landscape. It not unfrequently happens that the geologist, having familiarized him-

self with the succession and character of the rocks of a particular locality or neighborhood, by seizing the features and character of the prominent beds, is able to trace them in succession along the escarpment or mountain range as far as the eye can reach, and to approach them from any distant point with assurance that he has not been deceived.

"The strata which make these features in the landscape are the ever enduring rocks, which have withstood the action of the atmosphere through a period a thousand times longer than any structure of human origin. One cannot doubt that if properly placed in any artificial structure, they would still withstand the action of the elements. These escarpments, in their natural situation, may be coarse, rough and forbidding, more or less dilapidated or unequally dilapidated from the effects of time; but as they there present themselves, we shall be able to see their future in any structure exposed to the same influences.

"It is true, however, that no artificial structure or position will ever subject the stone to the same degree of weathering influence to which it is exposed in its natural position, but the same changes in degree will supervene upon any freshly exposed surfaces. In its natural position the bed has been encased in ice, washed by currents, saturated with rains and melting snows, frozen and thawed, and exposed to the extreme of summer heat without mitigation. The rock which has withstood these influences is quite equal to withstand the exposures of a few centuries in an artificial structure. Yet there are occasionally modifying influences and conditions which have sometimes subverted the permanence of a durable stone, and given preference to others less durable. It therefore becomes necessary to carefully examine all these conditions, and to determine not only from the rock in place, but also from its physical constitution, whether it will meet the requirements of the structures proposed.

"It not unfrequently happens, in working a quarry, that layers are reached which have not been exposed to the weather, and it is then necessary to test the strength and power of endurance of the stone. This may be done by repeated exposure to freezing and thawing, by testing the strength or power of resistance to pressure, etc. The exposure to freezing and thawing will not only determine its power of resisting the action of the weather, but will determine also whether such foreign ingredients as iron pyrite may exist in the mass. Chemical analysis may be resorted to, for the purpose of comparison with specimens of known composition and durability; but chemical analysis alone cannot determine, without other testing experiments, the strength or power of endurance of the stone.

"In some countries, and in certain localities in our own country, the evidence obtained from ancient structures is available in determining the durability of the stone which has been used. Yet it would seem that this information has been of little avail in many places, where the rebuilding of edifices is repeated every century. Experience in many cases does not teach the lesson anticipated; and when a dilapidated structure is pointed out, the argument is made that 'these stones were not well selected,' or they were obtained 'at the first opening of the quarry, and were not as good as now furnished.' And again, as already remarked, there are few cases in which parties are permitted to select the material without prejudice, the influence of interest, or the absence of important information. Examples are everywhere before us of the improper selection of materials for buildings, and these examples do not deter from their use in the erection of others. When good material is abundant and accessible, it will be used; in other situations, comparatively few durable structures are likely to be erected."

DESCRIPTIONS.

SMALL FAMILY HOUSES.

THERE is not in the Union a city that offers more ready chances to the man of moderate means to become his own landlord than Philadelphia, and it would be well indeed if all our other cities would adopt the excellent system by which this most desirable plan is carried out, that enables every man of sense, industry and independent spirit to rear up his own home and protect his little family from the cold blast of adversity, or still colder influence of a selfish landlord's exactions.

The too prevalent ambition in other cities is to be possessed of the lot on which the house is to stand, and thus become possessor of real estate. The gratification of this craving for full ownership is had at the expense of the desired house; for, the purchase of the lot has either swallowed up all the small capital, or has at all events so encumbered the house and lot as to leave but a poor chance indeed of clearing the mortgages which sit like a nightmare on the struggling man in his impalpable dreams of independence.

Better and surer by far is it to lease a lot at a moderate ground rent and use what money is available for building on it. By so doing the house is at once attainable, and the ground rent no more than the interest of the capital which would be invested in its purchase. The owner of this little home would feel the immediate benefit derived from such a course in the comfort of an acquired object, unfettered by debt, and which would at any time sell again for its full value at least.

Capitalists owning real estate in Philadelphia are ever ready to loan sums to those who lease lots of them for the purpose of building and improving

such lots. This borrowed building money can be paid back by instalments, or by way of rent, as is agreed upon; but in any case, the desire of the landowner is to offer inducements to settle on his property, thus enhancing the value of what yet remains unsettled.

This admirable system has thus far built up Philadelphia, and suburban streets are coming daily into sight with a magic rapidity that is certain to make it the largest city in the Union as it is now the best for the poor man who desires to own his house.

Tenement houses have no business in a city where such a just and liberal policy exists; for who would not prefer independent proprietary to the cooped-up troubles and vicissitudes of tenement house life.

Mr. A. T. STEWART of New York has, with a noble philanthropy, taken hold of this subject in a manner that none but a millionaire can attempt; and no doubt he will accomplish all that his master mind essays, and the citizens of overcrowded New York will have ample reason to bless him for the benefit his grand undertaking will in its completion confer, alike on the rich and the poor; for, by relieving the city of its crowded and sickly inhabitants, he at once improves the sanitary condition of the Isle of Manhattan, and renders happy its relieved denizens.

We hope soon to be able to give our readers a full description of Mr. STEWART's settlement; and we trust that other princely capitalists will follow his worthy lead, and help that most deserving portion of every community, those who industriously strive to rear up healthy families to become worthy, stable citizens, having a deep-set interest in the community of which they will yet make a part.

A SUBURBAN VILLA.

THE chief requirements in a composition of this class are to be found in the design here illustrated, viz.:—Massing the parts advantageously. Producing a sky-line of varied form, yet not confused; and the securing of ventilation, light, and shade. The style is mixed French and Italian. The position of the tower is expressive of unity and dignity; and viewed from any standpoint, the whole composition is interesting.

The plan of the principal floor is here shown:—A, The Vestibule. B, Hall. C, Drawing-room D, Reception-room.

The Second floor is arranged in chambers in conformity with this plan.

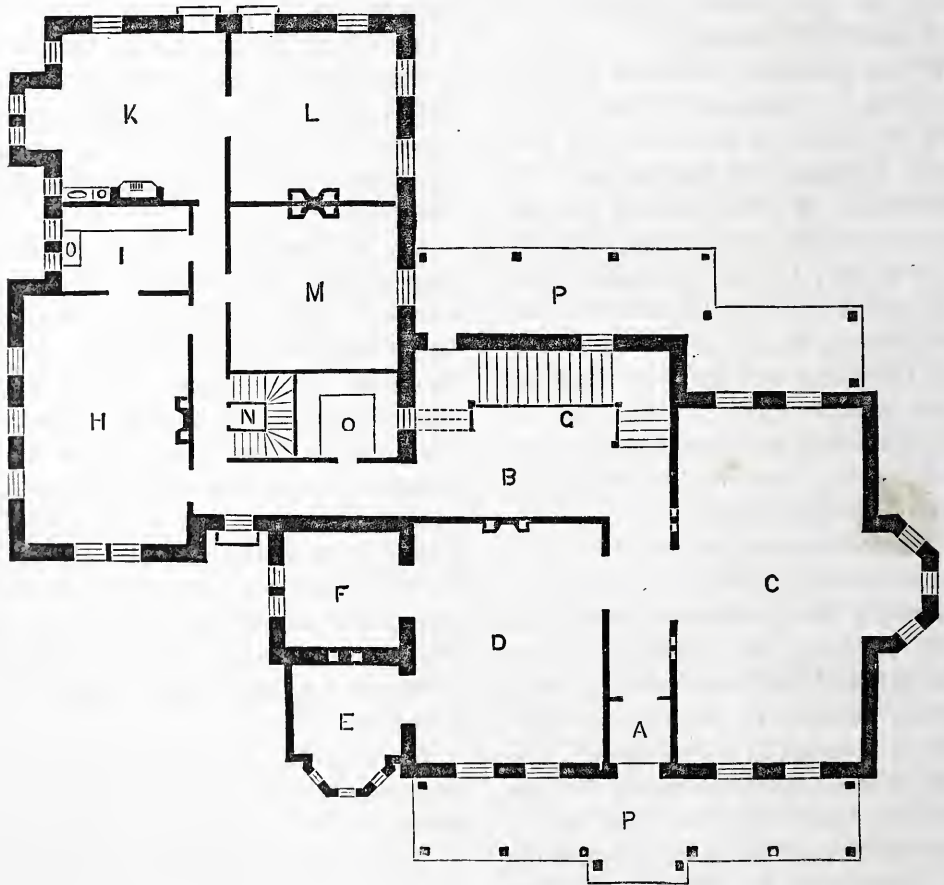
There are Attics also.

We here subjoin, for the information and guidance of those who may be disposed to follow out the study of this design, the specification of its construction as follows:

SPECIFICATION OF THE WORKMANSHIP AND MATERIAL to be used in the erection of a SUBURBAN VILLA for——near the city of——.

GENERAL DIMENSIONS.

The principal floor of the building contains a drawing-room 15 by 28 feet, with a bay window on the side 8 feet 6 in.



E, Boudoir. F, Library. G, Stairs. H, Dining-room. I, Butler's Pantry. K, Kitchen. L, Laundry. M, Servants' room, or Nursery. N, Stairs. O, Store closet. P, P, Piazzas.

wide by 4 feet 6 in. recess, and a reception parlor 15 by 19 feet, a boudoir 8 by 10 feet, and a library 9 feet square and both communicate with the reception parlor. The entrance hall is 5 feet wide

SUBURBAN VILLA.





with a vestibule 6 feet deep. The stair hall on the rear is 13 by 20 feet and contains the principal stairs. A passage leads from this hall to the dining-room, thence to the domestic apartments.

The dining-room is 14 by 19 feet, adjoining it on the rear is the butler's pantry 7 by 10 feet. The kitchen, laundry, and servants' room are each 13 by 13 feet. The dimensions of the kitchen are increased from this by an alcove 5 by 3 feet. The store-room is 7 by 8 feet, adjoining this is the private stairs.

The second story has six chambers and the attic has three, all of moderate size and well lighted.

EXCAVATION.

The cellar will be excavated throughout the entire extent of the building and will be 7 feet deep in the clear when finished. The trenches for the foundations will be 8 inches deeper than the bottom of the cellar; those for the porches will be of sufficient depth to ensure them against frost. The earth from the cellar will be graded around the building to within one foot 8 inches of the floor, and form a terrace about three feet high with sloping banks and an outward descent from all sides of the building. All superfluous earth and rubbish and refuse material to be removed at the completion of the work, and all left in a condition ready for occupancy.

MASONRY.

All the walls throughout the cellar will be constructed of quarry building stone of good quality laid on their natural beds; the first course in the foundation to be large and flat stone and solidly bedded in mortar.

All exterior walls to the principal parts of the building will be 1 ft. 8 in. thick and the others 1 ft. 6 in., all built up to the level of the floor. The exterior above ground will be faced with sand-stone, with a water table 8 in. wide around the whole building with a wash on the top, and have two inches projection.

The mortar for the masonry will be composed of clean sand and fresh lime; all the interior facings will be dashed with the same material.

CUT STONE.

All the door sills, window sills, outside steps, and chimney caps will be sand-stone, fine dressed and properly set.

BRICK WORK.

All the walls of the superstructure will be of brick and of good quality. The exterior will be faced with best red brick laid with straight and regular joints with perfectly even surface, rubbed smooth and prepared for painting. All to be 12 inches thick except the tower which will be 16 inches, the first and second story thence reduced to 12 and the boudoir will be 8 inches. All flues for heat, smoke and ventilation will be constructed as indicated and none to be less than 8 by 12 inches, all topped out above the roof according to the drawings and well pargetted. The mortar for the brick work will be composed of clean sand and fresh lime properly proportioned and manipulated. The piers and walls in the cellar will all be constructed with hard brick, and all trimmers for hearths, ash pits and jambs, will be constructed, and the space beneath the vestibule will be arched, to receive the marble or tile floor.

CARPENTER'S WORK.

All the joists of the two principal floors will be 3 by 12 inches, and placed 16 inches between centres, all to be straightened solidly blocked over the whole surface of their bearings on the walls; and each tier that is more than 12 feet long will require one course of lattice bridging through the centre. All trimmers for stairs, hearths, &c., will be double joists pinned together and substantially framed.

The joists of the attic floor will be 3 by 10 inches, otherwise the same as

above described. They will extend over the wall to receive the cornice with lookout joists across the ends and up the gables.

The rafters will all be 8 inches at the foot the usual taper, they will bear on a ridge pole at the apex, and a raising piece at the foot. The former will be 3 by 12 and the latter 2 by 6 inches, well nailed to the joists.

The roofs will all be boarded over closely with well seasoned boards, and prepared for slate.

Partitions.—All partitions that are wood will be constructed with 3 by 4 inch studding, those that support joists will be 3 by 6 inches, set crosswise; all door studs to be double thickness, and all partitions must be braced and well nailed throughout.

Porches.—The porches will be constructed according to the design and details made to a large scale. The joists will be 3 by 8 inches and 18 inches apart, supported on cross bearers 6 by 8 inches, one to each post. The roofs will be constructed with 3 by 5 inch rafters 1 foot 8 inches apart and boarded over closely for metal. The ceiling joists will be 3 by 4 inches and two feet apart, of yellow pine smoothed off with corners moulded, and boarded over the top with heart pine boards smooth side down, of uniform width and beaded joints.

The floors of the porches will be laid with $1\frac{1}{4}$ inch plank and square joints with an outward descent of two inches.

Windows.—All the window frames will be made for sash, double hung with sham axle pullies and best cord; those that extend to the floor have the bottom sash made to fly up into the head far enough to clear the meeting rail of the top sash. The sash will all be $1\frac{3}{4}$ inches thick except for the dormers and the rear building; these will be $1\frac{1}{2}$ inches thick; the frames will all be made plank face, with large mouldings on the outside; those to the rear building will have outside shutters $1\frac{3}{8}$ inches thick, two

panels moulded on one face and bead and butt on the other, hung with hooks and strap hinges and secured with 10 inch shutter bolts, back holders, rings, &c.

All the other windows of the first and second story will require inside shutters, three fold to each jamb, one inch thick and cut in the middle, hung and secured in the usual way. The jamb shutter will be paneled and moulded on one face and bead and butt on the other, and the back flaps will be filled in with pivot slats, made of hard wood all throughout. The first story will fold into soffits formed in the jambs and all throughout the second story will fold against the jamb; all the windows that have inside shutters are furnished with panel backs and elbow jambs moulded.

The cellar windows will have sash $1\frac{3}{8}$ inches thick, hung with loose joint butt hinges, and secured with small bolts; the frames are of solid scantling, moulded and built in the walls.

Doors.—The front doors are folding, $2\frac{1}{2}$ inches thick with large mouldings on one face and bead and butt on the other, and hung with 5 by 5 inch bronze butts, three to each door and secured with an 8 inch upright mortice rebate tumbler lock with night latch, and French bolt, all bronze. The frame will be scantling 4 by 8 inch, with large mouldings and circular head light over it. The vestibule doors will be folding, two inches thick, moulded below the lock rail, with circular top glass panels above it and hung with 4 by 4 inch bronze butts, and secured with vestibule rebate lock with key to match the night latch of the front door and two iron plate flush bolts all bronze furniture.

The frame will also be made with circular head light.

The other folding doors will be two inches thick, paneled and moulded on both sides and hung with 4 by 4 inch butts, three to each door and secured with 6 inch mortice rebate tumbler lock and two iron plate flush bolts. The

other principal doors throughout the first and second story will be $1\frac{3}{4}$ inches thick, paneled and moulded on both sides and hung with $\frac{1}{2}$ by 4 inch butts and secured with 4 inch mortice tumbler locks, all bronze furniture. The remaining doors will be $1\frac{3}{8}$ inches thick, moulded on both sides and hung with $3\frac{1}{2}$ by $3\frac{1}{2}$ inch butts and secured with $3\frac{1}{2}$ inch mortice locks, with bronze furniture in the principal part of the house and the remainder of ordinary kind. The outer one on the rear and the one beneath the main stairs will each have two cross bolts in addition to the locks. The frames of these will be solid 3 by 8 inches moulded without head lights.

The jambs of all the doors will be 1 $\frac{1}{2}$ inch thick, well nailed and let into the floor $\frac{1}{2}$ inch.

The main stairs will be constructed with $1\frac{1}{4}$ inch heart pine step boards, tongued and blocked to the risers and let into the wall string. The rail will be $4\frac{1}{2}$ by $2\frac{1}{4}$ inch moulded and the balusters $2\frac{3}{4}$ inch octagon shaft, and the newel will be 8 inches with octagon shaft and turned cap and base with curved step and panel spandrel moulded, with door and closet beneath; these stairs continue to the attic floor.

The private stairs will be constructed in the usual way for such stairs and continue to the attic with a door at each landing with the cellar stairs beneath them.

Floors.—All the floors will be laid with well seasoned southern heart pine boards, mill-worked and of cargo run. The best to be selected for the principal floors, which will also include the kitchen, laundry and servant's room. All to be blind-nailed and smoothed off after laid.

Dressings.—The dressings of the doors and windows in the drawing-room, hall and reception-parlor will be 8 in. moulded architrave, with 6 inch wash board, $3\frac{1}{2}$ inch sub and 3 inch moulding planted on the top, to member with and form part of the architrave. The dressings of the other principal rooms will be $6\frac{1}{2}$ inch

wide moulded, and the wash-board 5 inches with $2\frac{1}{2}$ inch sub and $2\frac{1}{2}$ inch moulding. The rear building and all the attics, and inside of all the store-rooms and closets will be $3\frac{1}{2}$ inch moulding and 5 inch wash-board with $1\frac{1}{2}$ inch moulding planted on the top.

Closets.—All the closets will be fitted up and fully shelved, with pin rails and metal clothes hooks to those that are used for ward-robes, and each of them will be fitted up with a nest of drawers.

The store-room and pantry will also be shelved, the latter will require dwarf-doors top and bottom, with one tier of drawers in the middle, and two nests in the lower section extending to the floor, and a draining-rack for dishes. The store-room will be fitted up with at least six bins, made with covers hung with butts.

The kitchen will be fitted up with a dresser, with doors top and bottom, paneled and hung with proper fastenings, and a row of drawers in the middle.

The laundry will be fitted up with three permanent wash-trays, made of two inch plank and made perfectly water tight.

All the exterior cornices, mouldings and brackets will be made in accordance with the working drawings that are made to a large scale.

A cellar door will be required on the exterior, made in two parts and hung with hooks and strap hinges to a wooden frame and secured on the inside with a swinging bar, staples, &c.

All the lumber throughout to be of good quality and all thoroughly seasoned; the joists all to be of spruce or pine; the studding and rafters may be hemlock.

The front and vestibule doors and balusters, rail and newel of stairs, and all the fitting up in bath-room will be walnut of the best kind and well seasoned.

SLATING AND TINNING.

All the sloping sides of the roofs that have sufficient pitch will be covered

with best blue mountain slate of medium size laid on felt with not less than three inches overlap and secured with iron nails boiled in oil. All gutters and flat portions of the roofs, including the porches and canopies to the windows, with all valleys ridge tin and flushings will be of tin of best quality and painted on both sides, the top side to have two coats of slate color.

All conductors to be 4 inches of corrugated pipe properly put up, with eave pipe, shoes and spout stones.

PLASTERING.

All the walls and ceilings will be plastered two coats of brown mortar and one coat of white. The drawing-room will require a cornice in the angle of the ceiling to girt 18 inches, a centre piece 5 feet long by 3 feet wide, oval. The reception parlor, boudoir and library will require a cornice to girt 15 inches, with a centre piece 3 feet 6 inches diameter in the former, and centre flower for gas lights in each of the latter. A cornice will be run in the dining-room and the hall of each story, and the principal chambers on the second story, all to girt 14 inches with a centre flower in the Hall of first story and vestibule for gas lights.

The ceiling throughout the cellar will be lathed and receive one good coat of brown mortar and white wash.

The ceiling of the first and second stories will be lathed and receive one coat of mortar, then to be cross lathed with shingling or furring lath 16 inches between centres to receive the regular coats of plastering.

The mortar for the plastering will be composed of clean river sand and fresh lime, properly prepared at least two weeks before use.

PAINTING AND GLAZING.

All the woodwork interior and exterior that it is usual to paint will require three coats of pure white lead and linseed oil done in such tints of

plain color as desired, the kitchen, laundry and servants' room will be grained oak done in oil. All the hard wood will be oiled three coats, done with prepared oil; this will include the ceiling and floors of the porches and the floors of the kitchen, laundry and servant's room.

The glass in the head light of the front and vestibule doors and the top panels of the latter will be of French plate, and the drawing-room and reception parlor will be French crystal sheet. The windows over those in the second story and those in the dining-room will be of French sheet; and all the rest of good quality American all well bedded, bradded and back puttied.

PLUMBING.

An attachment will be made with the main in the street, and carried to the range in the kitchen, from which the hot and cold water supply will be conveyed to the wash trays in the laundry to which there will be a large waste to discharge into the soil pipe, all the above fixtures to be brass. A butler's sink in the butler's pantry of medium size, of copper tinned and have supply of hot and cold water with large waste to discharge into the soil pipe; and plated fixtures. The bath-tub in the second story will be lined with copper tinned and have supply of hot and cold water with large waste to discharge into soil pipe. A tubular shower will be placed over the bath-tub for cold water.

A wash basin will be fitted up in the bath-room with marble top counter sunk and china bowl with hot and cold water supply with large waste to discharge into the soil pipe.

A water-closet will be fitted up in the bath-room with 5 inch iron soil pipe; the closet to be of best pan with reservoir, and fitted up with hinged lid and plank seat, riser, &c. The soil pipe will discharge into the drain pipe; and all have plated fixtures.

All the fitting up in the bath-room will be done with hard wood, the tub

will be paneled and moulded and neatly capped, and the wash stand will be paneled and moulded with closet beneath it. The wall will be wainscotted about 4 feet high, with a neatly moulded cap on the top.

All waste pipe will require traps and all pipe to be extra strong, with all necessary stop, draw and waste cocks to make the whole complete, including a wash pave, and all the connections with water back and circulating boiler, the latter to be of galvanized iron and contain 40 gallons.

The range will be of medium size with two ovens and of approved make, with water back.

The drain pipe will be 8 inch Terra Cotta.

The pipe for the introduction of gas will be of the requisite size for the following burners, 9 in drawing-room, 6 in reception-room, 1 in vestibule, 1 in hall of each story, 2 in boudoir, 2 in library, 4 in dining-room, 2 in servant's room, 1 in kitchen, 1 in laundry, 1 in butler's pantry, 2 in each of second story chambers, and 1 in each attic chamber, 1 in bath-room, 1 in cellar, all fitted up with pipe concealed and left in a condition ready for connection with meter and fixtures.

HARDWARE AND IRON.

All locks, bolts, &c., as specified under the head of Carpenter Work, will be of good quality and such other as shall be needed for the completion of the work.

The cellar windows will all require iron guards, built in the walls, and such other iron work provided that may be needed during the progress of the work.

Bells.—The bell from the front door will require a bronze pull to match the furniture of the door.

A bell will be required from each chamber to the kitchen and one to the servants' room, all fitted up with copper wire within tin tube concealed beneath the plastering.

FURNACE.

A furnace of an approved kind will be set in the cellar inclosed with brick work; the heated air will be conveyed to the several flues through tin pipe and the smoke will be conveyed to the smoke flue through Terra Cotta pipe. The registers throughout will be of the requisite size, in proportion to the rooms; they will be bronzed in the principal rooms of the first story and the rest japanned.

MANTLES.

A mantle will be required for the reception-parlor to cost \$150, one in dining-room to cost \$75, and four up stairs to cost \$60 each, all set with hearth and fireboards with registers set in them.

LIGHTNING ROD.

A lightning rod of $\frac{5}{8}$ inch copper wire rope with rod and platinum point will be put up in the tower and will extend from the top to the ground, with an iron bar to extend about four feet into the earth.

FINALLY.

The contractor is to provide at his own cost and expense all the materials and workmanship necessary for the erection and completion of the building in all its parts according to the plans, drawings and the intent and meaning of this specification.

The workmanship to be done in a good and workmanlike manner, and the materials of every kind to be of good quality.

A STREET FAÇADE.

IT is one of the most difficult things which architects have to contend with, the avoidance of sameness in a long stretch of street front, and at the same time the retaining of the show of a required unity throughout.

Nothing is more subversive of purity

of design in city street architecture than the gross inequality of heights of many houses composing a continuous block. And it is to suggest a remedy for this inelegance of effect that the accompany-

one regular, well-balanced composition.

It will be perceived that in the form of the caps of the second story windows the effect of two wings and a centre is

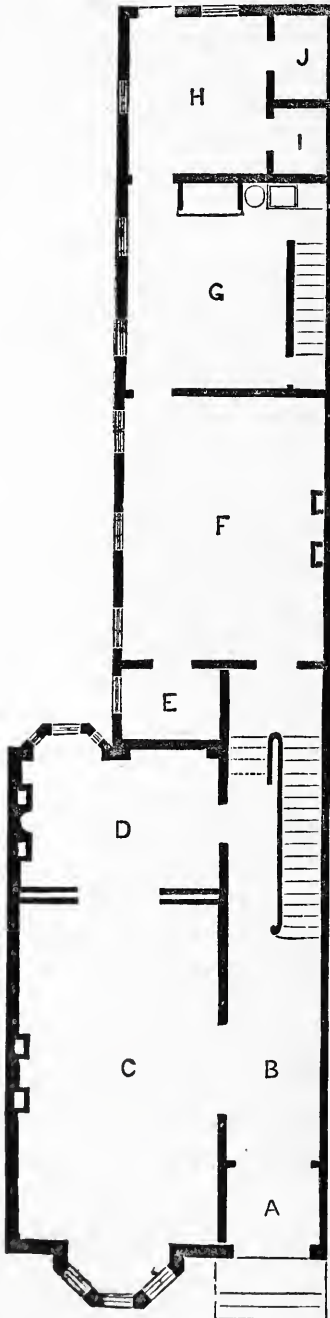


FIG. 1.

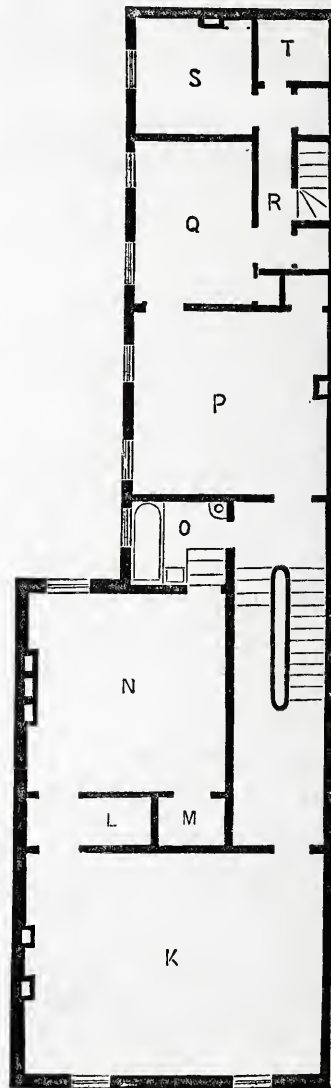


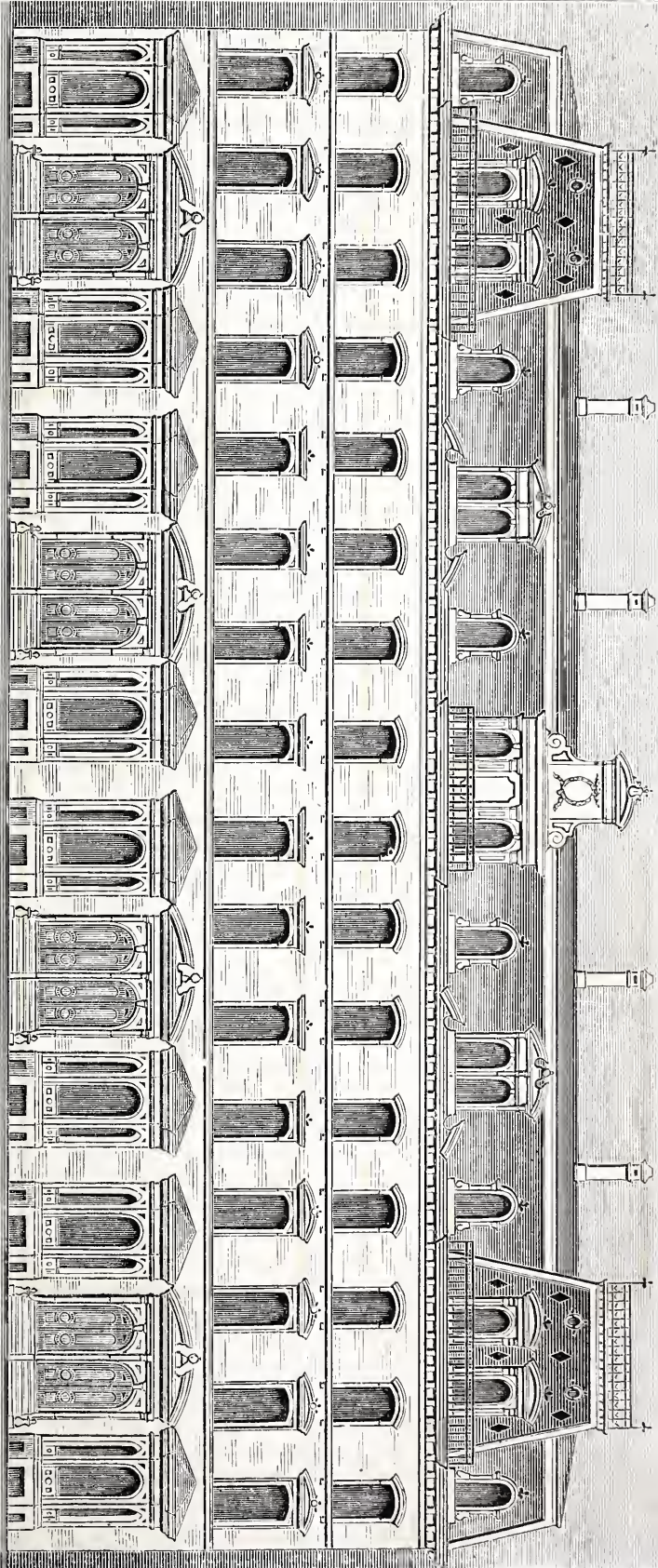
FIG. 2.

ing illustration of a street façade is presented.

Here are eight houses, forming four couples, perfectly independent as to internal plan; but, externally forming

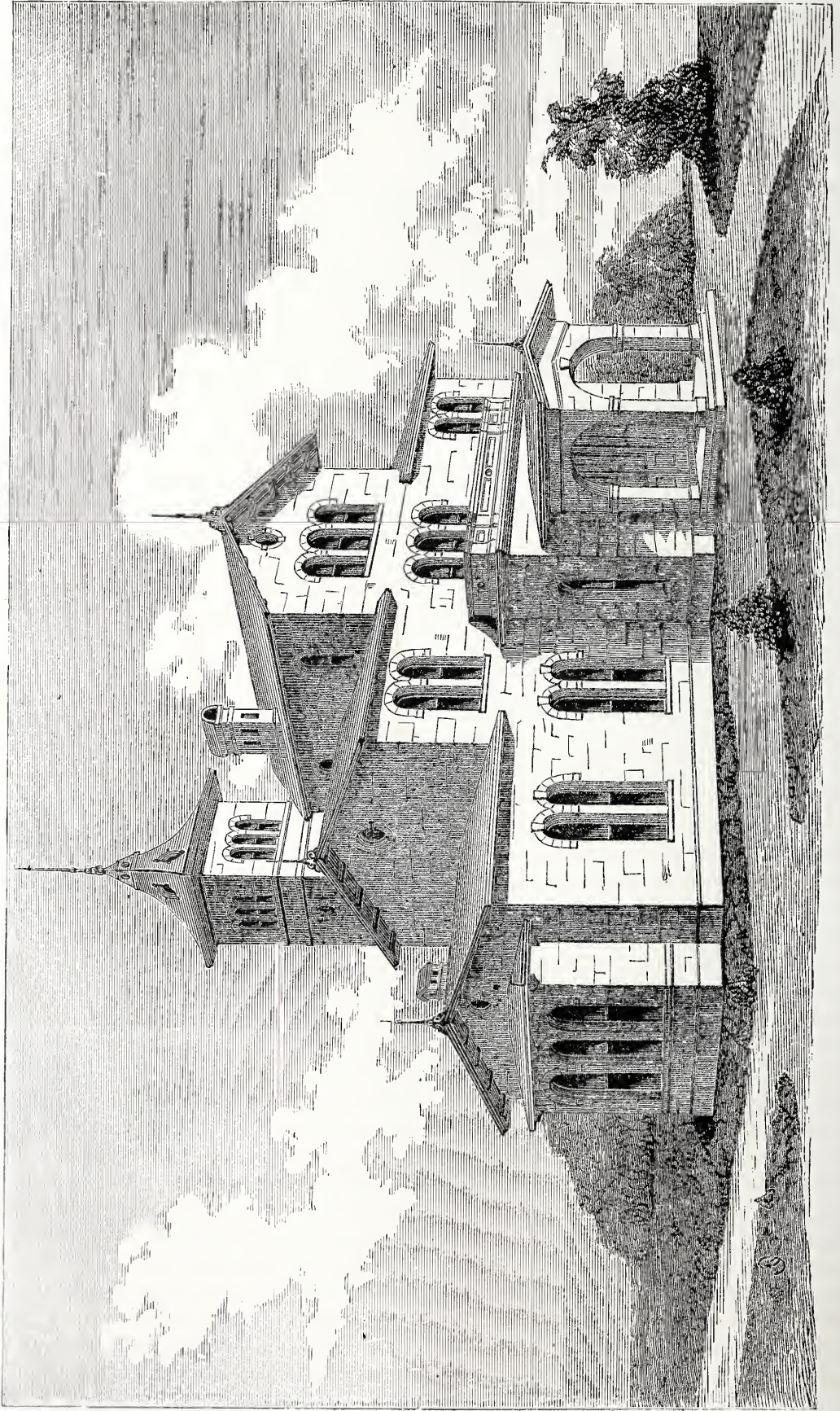
produced by pedimenting the two former, and leaving the centre ones flat.

In the Mansard roof a marked distinction is made, so as to gain the required effect as palpably as possible. The cor-



CROSS-CUT - WEST - SCOTT

STREET FACADE.



ITALIAN VILLA.

nice, too, is broken, and the dormer-windows (coupled and single) made as distinct in their respective characters as possible.

The centre-piece of the Mansard relieves the monotony which must otherwise be apparent and at the same time gives no advantage in the actual plan of the attic over the remainder of the roof rooms.

The plans of one house will suit all the others, and the arrangement of them is as follows:

FIG. 1 is the principal story, or ground plan—A, is the vestibule. B, Hall. C, Reception parlor. D, Back parlor, with triplet bay window. E, Pantry. F, Dining-room. G, Kitchen. H, Laundry. I, Store closet. J, Smoke house.

FIG. 2, the second floor—K, Principal chamber. L, Closet and passage. M, Closet. N, Chamber. O, Bath-room. P, Chamber. Q, Nursery with closet R, Hall with closets and back stairs. S, Servants' room. T, Clothes closet.

ITALIAN VILLA.

THERE is no style of Domestic Architecture which surpasses the Italian in that peculiar expression of completeness which is so very winning to the eye, and which conveys more directly the idea of elegant comfort unalloyed by redundancy. The villa now under consideration, if executed in white marble, with gray marble hoods, and buff soffits of cornices, handsomely slated, would be a charming object in any landscape. If built in Ohio stone it would look, if not so bright, at least as elegant. In brown stone the sombreness produced would tend to thwart the required effect. And erected in brick (especially red or cherry color) the intent and meaning of the style would be completely lost. Knowing this, the latter material is often covered or disguised in stucco, or by paint, and ruled off in imitation of stone. Such a treat-

ment is very ill-advised, if it were merely for the total want of permanency thus incurred, and the fact that the whole is a deception, will detract so much from the merit of its outline as to forbid such a proceeding. If it should be advisable to construct such a design in wood, let the covering of the framing be clap-boarding, or vertical boarding, with slats covering the joints. But in such case let the material be *evident* and no recourse be had to imitations, however good in themselves.

The plan will be found convenient as well as comfortable, and offers ample opportunity for the highest finish as well as the plainest.



A, the Vestibule, in front of which is an open porch whose pedimented roof abuts against the square form of the former. Over this vestibule is a paneled balcony which forms a balustrade to it. B, the Hall and staircase. C, the Library connected with D, the Dining-room, by means of sliding doors. E, the Kitchen off of the dining-room. F, the Butler's pantry, convenient to both dining-room and kitchen. G and H, the two Parlors connected by ample sliding doors. H has a handsome triplet bay window, and each has a sash door leading out on the veranda, L.

This Italian villa, if constructed in stone laid square rubble, and faced off, (provided the stone is in the immediate

neighborhood,) will cost, at ordinary prices of material, \$17,500.

If it be erected in brick and painted, its cost will be \$18,000.

Of course we cannot speak for those localities where circumstances will so outrule these estimates as to make them altogether useless. And, as we have already hinted, it may be desirable to construct in wood, the local market price of which material will suggest to any intelligent builder the difference between it and brick or stone. We will here, however, present an estimate of the cost of such a design if executed in wood, at the average prices of materials in our Philadelphia market at this time.

ESTIMATE.

356 yds of excavation at 60 cts. per yd.....	\$213 60
90 perches of stone at \$5.50 per perch laid in the wall.....	495 00
18,000 brick for chimneys, at two cts. per brick, laid.....	360 00
12,000 feet of flooring joist, at \$22 per M.....	264 00
7,000 feet of timber for frames, at \$22 per M.....	154 00
5,000 feet of scantling for roof, at 22 cts. per foot.....	110 00
12,000 shingles, at \$12 per M.....	144 00
6,000 feet of weather boarding at \$45 per M.....	270 00
36 windows, with inside shutters, at \$36 per window.....	1296 00
11 windows without shutters, at \$12 each.....	132 00
38 doors, at \$16 each.....	608 00
5,000 feet of flooring boards at \$45 per M.....	225 00
4,000 feet of first common, for in- side finish, at \$60 per M....	240 00
3,000 feet for outside dressings, cor- nices, and porch, at \$60 per M.....	180 00
5,000 feet second common stuff, at \$45 per M.....	225 00
Carpenter's work.....	3,200 00
2,100 yds. plastering, at 50 cts. per yd.....	1,050 00
Painting and glazing.....	1,230 00
Plumbing.....	275 00
Gas pipe.....	130 00
Hardware.....	440 00
Range, with water back.....	90 00

Boiler (40 gallons) galvanized iron.....	\$40 00
Furnace.....	275 00
7 Mantles.....	600 00
Iron work.....	30 00
Lightning rod.....	27 00

\$12,233 60

Add 10 per cent. for contingen-
cies..... 1,223 36

Total cost..... \$13,456 96

A RURAL RESIDENCE.

WHERE perfect plainness and solidity without absence of variety is sought, this design may meet the wishes of some to whom the graver appearance is desirable. The eaves here cast a deep shadow in their bold projection beyond the walls; but the evident solidity of these latter is all sufficient to the support of the apparent weight. The perfect squareness of the openings, the lintels, &c., give to it a quaint, yet not altogether unpleasing, effect.

The interior is spacious, airy, well lighted, and convenient.

A, the Vestibule. B, the Hall with the staircase leading upstairs and down to the basement. C, the Library. D, the Parlor connected with the hall and library so as to form an *en suite* by means of sliding doors. E, the Drawing-room with an ample bay window and connected by sliding doors with the parlor and with the hall. F, F, are Chambers with closets. G, Water-closet. H, Bath-room, accessible under back stairs I, or from Chamber F. K, Roof of kitchen entrance. L, L, the Verandas, front and rear.

The Dining-room, Kitchen, Pantries, &c., are in the Basement; and the entrance to the dining-room on the ground line is in the Tower, as shown in the perspective illustration.

The Chambers on the second, or more properly the third story, are full height, and give ample accommodation. But the

RURAL RESIDENCE.



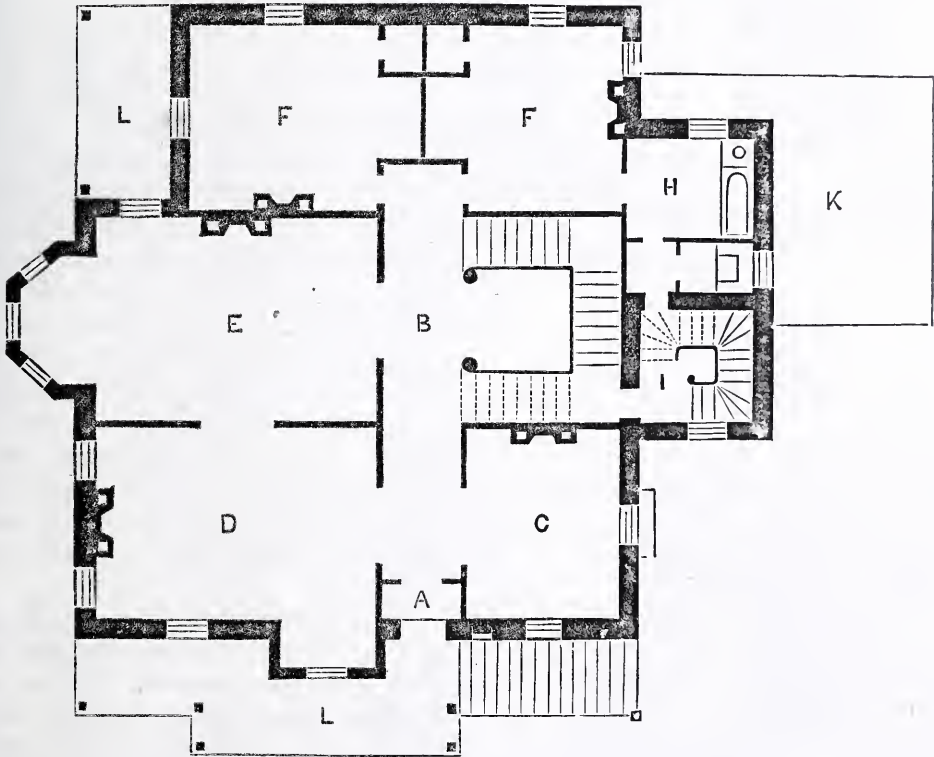
best chambers are on the principal floor, as already stated. The staircase is lighted, as may be seen, by a square cupola.

This is a very roomy house; and, whatever objections may be made to it externally, its interior arrangement is such as to make it a desirable residence for a large family in the country, where its quaintness would not subject it to that scrutiny which in the immediate neighborhood of a city it would have to undergo.

The Kitchen and Dining-room being

ESTIMATE.

570 yds. of excavation at 60 cts. per yard.....	\$242 00
110 perches of stone in cellar story, at \$5 per perch, laid in the wall.....	550 00
Window and Doorsills.....	175 00
241 perches of stone in super-structure, at \$8.50 per perch in the wall.....	2,898 50
8,250 feet of flooring boards at \$45 per M.....	371 25
16,000 feet of flooring joists at \$22 per M.....	352 00
6,000 feet of roofing timber, at \$22 per M.....	132 00



on a different floor from the Parlor and Drawing-room, is certainly an advantage, in the perfect freedom from the often unpleasant odors which come from the former. The domestic work of a family is by this arrangement kept completely out of sight of friends who visit them; and all that comfort which privacy confers is here assured.

With regard to the cost of such a house we subjoin an estimate.

3,500 feet of sheathing boards, at \$25 per M.....	87 50
8,000 feet of scaffolding at \$24 per M	192 00
17 windows in principal story, at \$36 each, including inside shutters.....	612 00
15 windows on second story, at \$16 each.....	240 00
14 windows on basement, at \$12 each.....	168 00
55 doors, at \$18 each.....	990 00
7,000 feet first quality lumber for finishing, at \$60 per M.....	420 00

8,000 feet second quality, at \$45 per M.....	\$360 00
5,000 feet first quality, for exterior at \$60 per M.....	300 00
Carpenters' work for finishing	2,100 00
Main stairs.....	600 00
Private ".....	290 00
2,700 feet slating, at 13 cents per ft.	351 00
Tin work, including Conductor.....	230 00
3,500 yds. plastering, at 50 cts. per yard.....	1,750 00
Painting and Glazing.....	1,600 00
Plumbing.....	475 00
Gas pipes.....	190 00
Hardware.....	480 00
Bells.	48 00
Range, with water back.....	90 00
40 Gallon circulating Bath....	40 00
Furnace and Registers.....	350 00
2 Low down Grates.....	100 00
9 Mantles.....	800 00
Iron work.....	70 00
Lightning Rod.....	36 00
	<hr/>
	\$17,790 25
Add 10 per ct. contingencies,	1,779 02
	<hr/>
Total cost,	\$19,569 27

LES PROMENADES DE PARIS.

RESTAURANT DE L'ISLE. BOIS DE BOLOGNE.

FROM this magnificent publication we select for the present month the subjoined illustration, together with the plan which accompanies it.

Here the Swiss style under French treatment is presented in all its bewildering display of ornamentation, well suited to the *gaieté de cœur* of the liveliest nation in the world.

There is an inexplicable Swissness of style evident throughout.

Occupying the site which this RESTAURANT DE L'ISLE does, on a comparatively flat surface, it would not perhaps be as acceptable to public taste to retain in rigidity the peculiar features of the perfectly unadulterated Swiss style, and therefore the French application of it is at least admissible. We do not desire to criticise the design itself, nor the possible ideas which gave it birth, but

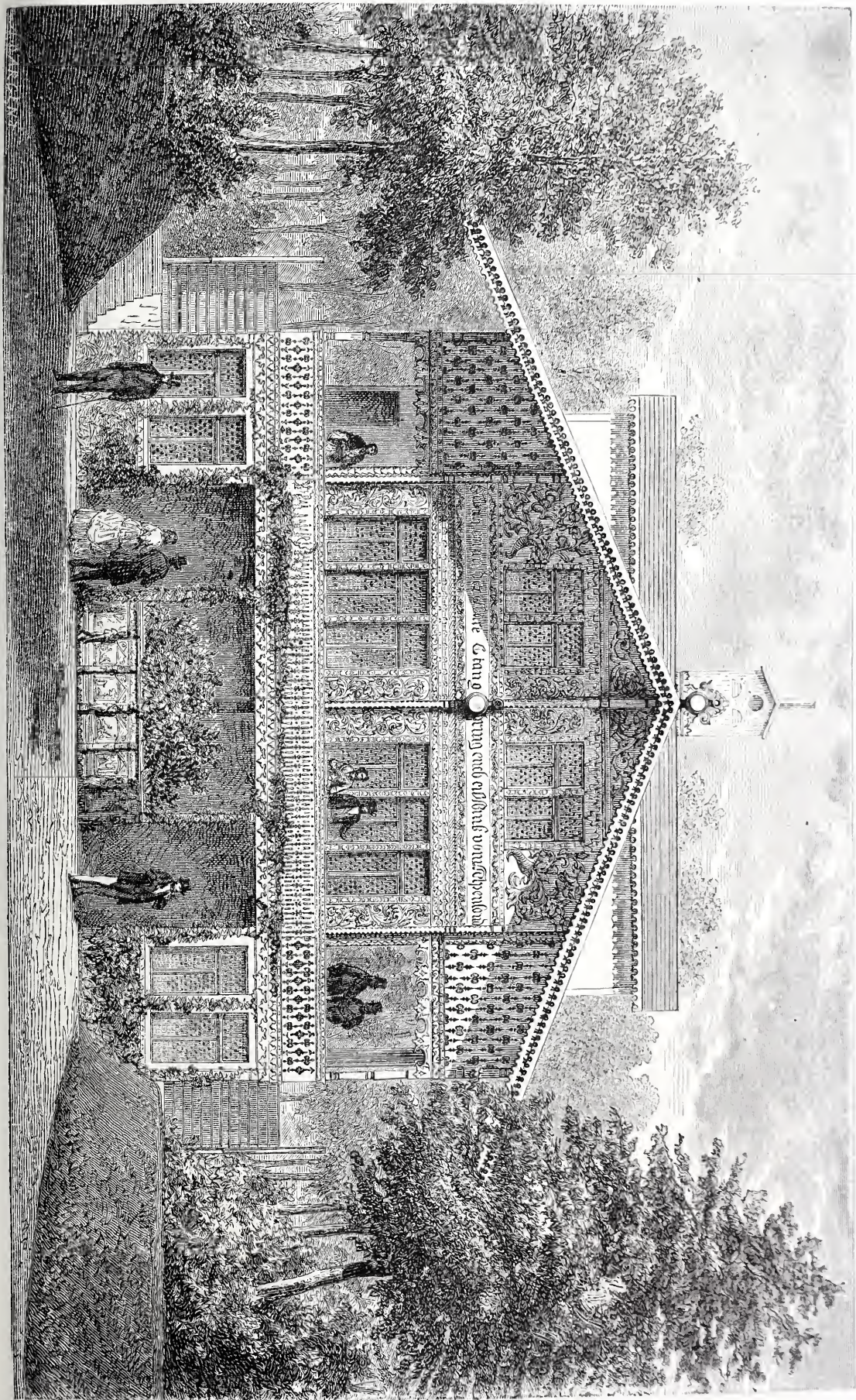
merely to offer a conjecture as to its meaning.

In our American Cottage Architecture we professionals in this country have stolen our bracketed eaves from the same source, and mixing in the Tudor hoods and label mouldings, with some other English features have produced a combination which has, in a measure, become our national style.

To be sure we are not particularly vain of it, as a style; but we are rather attached to it as a convenient mode of construction in our wide-spread forest material.

In the same way our French cotemporaries find in this Helvetican exotic a ready promoter of their own fancifulness, and they enter into an *entente cordiale* with it under the style and title of the Franco Swiss. And why not? We all do a far greater injustice (if injustice it be) to the Norman, by appropriating it wholesale, and after taking certain liberties with its character still maintaining that it is Norman nevertheless. Let us acknowledge then, we are all in fault, and theft in architecture, as in literature, has become an international failing. But we are not correct in saying "has become;" for, was it not always a besetting sin of the nations since architecture first put in a claim to notice?

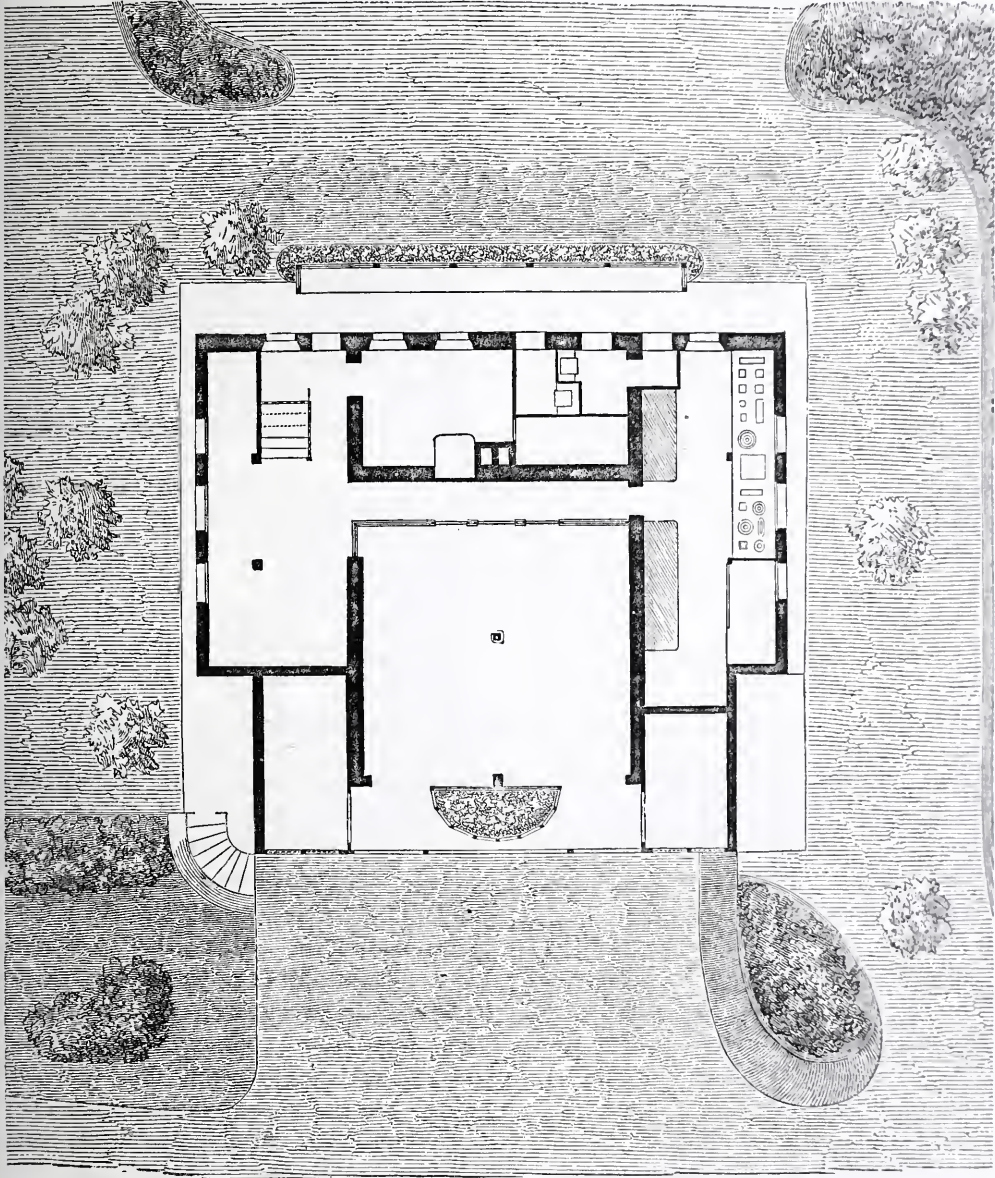
The Grecian stole from the Egyptian, the Roman from the Grecian, the Goth from the Roman—and so on down to our own day, until this very thieving propensity has become dignified into "Classic Taste," and he that steals most boldly is more "classic" than his more timid cotemporaries. What right has the Roman architect to grumble in his grave at this spoliation of his property, any more than his Grecian brother from whom he stole it? And, why should the Grecian architect complain of the purloining of that which belonged in truth to the Egyptian? Even the latter was indebted to a prior proprietary of design—and so each and



all have been filchers of thought, however much they may have enhanced that thought by the additions of their own.

This line of contemplation is soothing to our feelings, and we begin to think that ARCHITECTURE after all is common

TASTE being the ruling deity, every nation is entitled to its own share of the gift the goddess bestows, and one has no more right to an extra share than another. Thus, what delights the eye of one should not offend that of another;



property, of which each may take a share and improve it, and in so improving do the world at large a favor. Our art is Cosmopolitan, and all nations are alike concerned in its advancement and improvement; eclectic ability being, of course, as desirable as inventive power.

but each be content in the enjoyment of its national portion.

In the publication before us it is not sought to advocate beauties or extenuate faults in an architectural sense; but simply to illustrate the objects worthy of notice. And this SWISS RESTAURANT

DE L'ISLE, standing in a most interesting position on the beautiful little isle of the *grand lac* is surely a good selection. Nothing can be more attractive than its appearance as it gleams out in some charming vista.

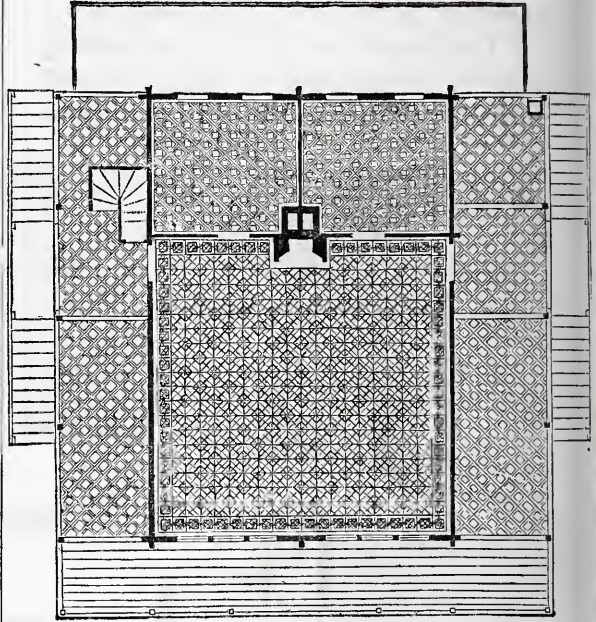
Its plan is simple, yet well adapted to its social purpose.

The Bois de Boulogne has several of these restaurants, but not one more attractive than this.

The carving is well executed and highly characteristic of a first class Swiss chalet. The grounds around are perfections of landscape gardening; and sunshine and shade have each their full play.

The first plan shows the arrangement of the ground floor with its saloon, dining-room and kitchen, &c. This floor is below the artificial hill and flights of steps on the outside lead to the floor above. (Shown in the second cut.) This

is elegantly tiled and completed in a



style worthy of the social purpose to which the chalet is dedicated.

EDUCATIONAL ARCHITECTURE.

HOLLIDAYSBURG FEMALE SEMINARY.

THE flourishing little capitol of Blair County, Pennsylvania, where this seminary is located, is peculiarly fortunate in its situation, on the Juniata river near the eastern base of the magnificent Alleghany Mountains. It is distant from the Capitol of the State (Harrisburg) 120 miles by turnpike, and 137 miles by railroad; and is the outlet for the rich mineral productions of the Juniata Valley.

The building stands in a most delightful surrounding of cultivated grounds, and commands a fine view of the town, which it overlooks. The scenery in every direction is charming; and the salubrity of the atmosphere adds to the attractiveness of the place, making it all that is most desirable for a nursery of the mind and the body, giving health and activity to each, and thus conferring

on society the boon of all others the most estimable, a perfectly developed generation to influence its progress morally and physically in the future.

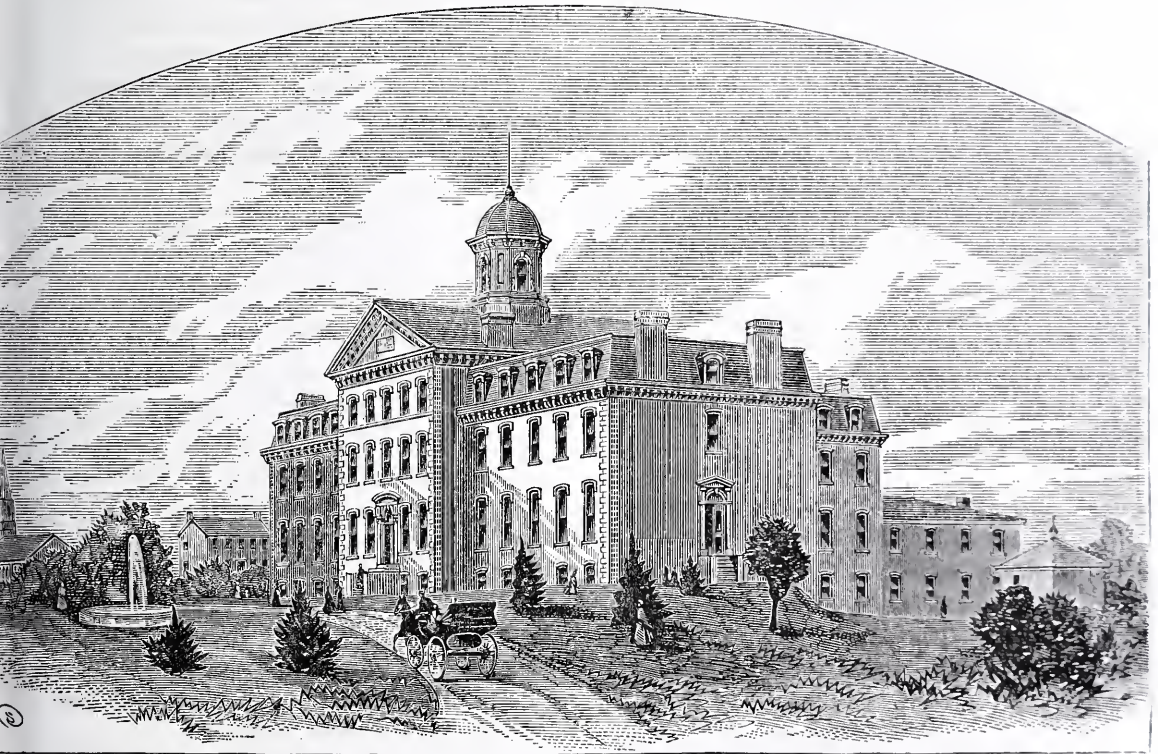
The building, recently finished by the liberality of a few citizens, is one of the most elegant and complete in the country, an ornament to the town and an honor to those who planned and erected it. It was carefully planned by its architect for the special purpose of a Female Seminary. The ground plan has the form of a cross. The front is 150 feet in length, and the extreme depth is 160 feet. The walls are built of stone, and are all *furred* to prevent dampness—a precaution hardly necessary in the situation. The roof is of slate, and combines three styles, presenting a varied and pleasing appearance. The rooms of the principal story are fourteen feet

in height; of the second story, eleven and a half; of the third, nine and a half. Every window sash moves by means of cords and weights; each door has a transom; the halls are wide and unobstructed, so that every room can be thoroughly ventilated. The house is lighted throughout with gas. A very important matter to every student is to have wholesome water. In this respect this school is abundantly provided. A mountain stream of very soft water,

otherwise. The Presbyterian, Baptist, and Lutheran churches are not more than a square from the Seminary grounds, and the Methodist Episcopal Church but little further distant. There is preaching in all these churches every Sabbath.

The President is Hon. SAMUEL S. BLAIR. The Principal is Rev. JOSEPH WAUGH, A. M., and the Faculty is composed of capable teachers in every branch.

We have not a diagram of the arrange-



always clear and pure, is taken by pipes to all parts of the building. This also furnishes one safeguard from fire.

Each room is furnished with a wardrobe, bureau, close washstand, carpet, gas, and everything necessary for home comfort. Each bed is furnished with two comfortables, a blanket, mattress, and sheets. Pupils desiring more covering must furnish it at their own expense. Pupils furnish their own towels, and should bring overshoes and umbrellas.

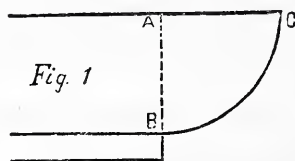
All pupils attend church with the Principal, unless their parents direct

ment, or plan, of the building ready for this publication, but will give one in our next, together with any remarks the reverend Principal may favor us with; ill health preventing his attending to the subject just now.

We would again solicit the attention of all other Principals, and friends of education generally, throughout the country, to forward us any information they may possess; so that this department of the REVIEW may be sustained with that earnestness which its undeniable usefulness ought to command.

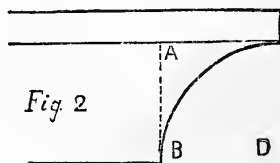
LESSONS FOR LEARNERS.

WE now proceed to induct our student readers into the describing of the several moldings in most general use in architecture.



THE OVOLO. (Fig. 1.)

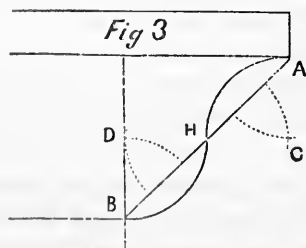
Take the height A B; then taking A at the centre and A B as a radius, describe the quarter circle or quadrant B C. The fillet on which this ovolo rests will terminate on a line with the semi-diameter A B, as shown.



THE CAVETTO. (Fig. 2.)

It will be observed that whilst the fillet supports the ovolo, the cavetto, on the contrary, sustains the fillet; the two figures being the inverse of each other. The cavetto is easily described, as follows:

On B, with the height A B, describe an arc on the projection at C; with the same distance describe another arc cutting the former at D: then with the same extension on D describe the arc B C, and it will be the cavetto.



THE CIMA RECTA. (Fig. 3.)

Join the projections at each end by the right line A B, divide it into two

equal parts at H, and in order to make it look bold, divide H B into three nearly equal parts. Also divide H A in the same manner. From A and B respectively, as centres, taking two parts to each as radii describe arcs at C and D. Now from H as a common centre with the same length of radii, cut these arcs at C and D; and from the points of intersection C and D as centres describe the required figure.

Care must be taken with the centres, so as to ensure the exactness of connection of the two segments and thus form a uniform *cima recta*.



THE TORUS. (Fig. 4.)

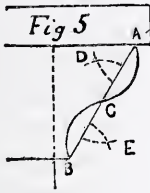
Divide the height between the fillets into two equal parts at E, and with E as a centre and half the height as radius, describe a semi-circle outwards from the fillets and the *torus* is formed.

The *Bead* is described in the same manner; it being in fact a diminutive torus.

These compose the regular moldings, that is to say, those whose height and projection are equal. But there are still other forms where the projection is often less than the height, and the curvature of the molding much flatter; however, the same methods of describing will answer equally for each.

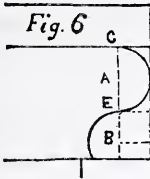
We now come to the describing of QUIRKED MOLDINGS, the contours of which are not so easily produced as those of the preceding; yet, as they are and will be in very general use, it is

highly necessary that they should be closely studied and clearly understood by the learner.



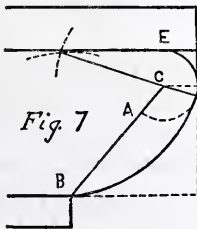
THE CIMA REVERSA. (Fig. 5.)

This figure is simply the reverse of the cima-recta and is described by joining the projections at A and B by the line A B, and proceeding in the same manner as with that figure.



A QUIRKED CIMA REVERSA. (Fig. 6.)

Divide the perpendicular height into seven parts; with two of the parts describe a semi-circle C E; on A draw a line from E C, and on the height of the first division from the bottom B, describe the arc C D, and it will complete the molding.



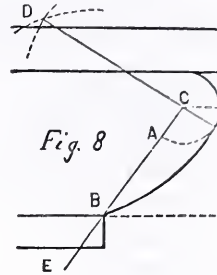
A QUIRKED OVOLO. (Fig. 7.)

Divide the height into four equal parts; with one point on C describe the arc C D; on C with the distance A B, describe an arc cutting the former at D. Through D and C draw the line D C F, cutting the small circle at F; then with a radius D F, describe the arc F B, and it will complete a *quirked ovolo*.

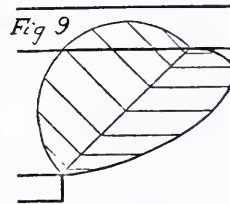
A FLAT QUIRKED MOLDING. (Fig. 8.)

This molding is in more general use

than the preceding, and is therefore of much consequence to the learner.



Describe the smaller circle as in the last; and through its centre and the end B of the fillet draw the line C B E, taking E according as you intend to have the under part of the molding flatter or quicker. Take the distance E C, and on B describe an arc at D, then take the distance E A that is [E C made less by the radius C A of the smaller arc A F G] on C with that distance describe an arc cutting the former at D. Lastly, on D, with a radius D F, describe the arc F B, and the required quirked ovolo is complete.



QUIRKED MOLDING. (Fig. 9.)

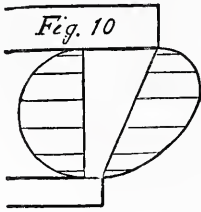
By another method.

Supposing the projecting to be such as that shown in the diagram; divide the inclined line into two equal parts, and from the centre describe a semi-circle, the circumference of which divide into eight equal parts. From these eight divisions draw lines to the diameter, or inclined line, perpendicular to the inclined line. Then from eight points of meeting on the inclined line draw eight lines parallel with the fillets, and each equal in length with its corresponding line perpendicular to the inclined line. Draw the curve joining the ends of these horizontal lines.

QUIRKED MOLDING. (Fig. 10.)

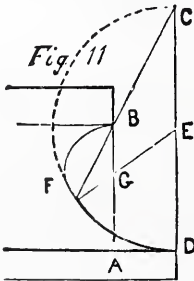
By the same method.

In all the quirked moldings described the upper fillet extends out so as to



range with the extremity of the curve line. The termination of the under fillet is the point from which the projection of the curve of the quirked molding starts.

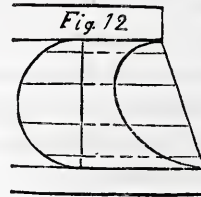
In this instance the projection is less than in any of the preceding, and the upper fillet does not project to the same extent with the others. A perpendicular line is erected between the two fillets, which is divided into two parts, and a semi-circle is struck from the centre of it—the circumference of which is divided into several parts and parallel lines drawn to the perpendicular and lines of similar length continued on the inclined line or base of projection. Through the extreme points of the latter the quirked molding required is drawn.



A SCOTIA. (Fig. 11.)

The fillets being determined as to length, from the upper one a perpendicular is let fall, as B A. Erect a parallel to it, and perpendicular to the lower fillet, at D. On this perpendicular set off twice the length of D A, on the lower fillet, namely, from D to E and then double it. Now, from E as a centre, with E D as a radius, describe the semi-

circle D F C. From C draw a line to the circumference touching the upper fillet at B. From the centre to the circumference draw the radius E G, which will form an acute angle with the line C B. Lastly, from the point G, where the radius intersects the first perpendicular, B A, describe the arc F B, and strongly marking the curve D F B thus found, the *Scotia* is complete.



THE SCOTIA. (Fig. 12.)

By another method.

Connect the fillets by an inclined line. At a little distance draw a perpendicular, from the centre of which describe a semi-circle. Divide the circumference into five parts and from each point of division draw parallel lines to the diameter and continuing these to the inclined line, from it measure off the length of each line to agree with those of the semi-circle and through the points of measurement draw the required *Scotia*.

A CURIOUS INVENTION.—A Berlin letter says: "*Apropos* to dangerous inventions, I may mention one of a very different character which, together with its inventor, has lately fallen into the hands of the police. It is a machine for opening iron safes. It accomplishes the undesirable object partly by boring and partly by filing, and does its work so rapidly and with so little noise as to render the safety of such a receptacle almost illusory. The inventor displayed the power of his machine last week at the Central Police Office, and in the presence of several official persons, who were far more astonished than edified at the wonderful results attained. It only requires one man to work it."

WATER-WORKS BUILDINGS, ERIE, PA.

THE view of the water works at Erie, Pennsylvania, is presented as an example of a truly American structure, built with a view to economy, and at the same time presenting an attractive picture. The building is not ornamented and decorated in elaborate style, as are some of the European water works; but, while it preserves a pleasing symmetry, it explains, almost at a glance, the object of its construction; and, in regard to the small amount of time and money required, and the completeness and adaptability to the work intended, it must be looked upon as a triumph of engineering skill.

What strikes us as peculiar about this design is that it cannot mislead any one. It does not resemble a school-house, a penitentiary, or a freight depot, as too many of our works of this class do. It has a certain distinctive character about it that leads the understanding to a prompt decision on its particular object, the purpose for which it was erected, and in this, as in the excellent arrangement throughout, much credit is due the engineer, Mr. H. P. M. Berkinbine, who designed and carried out the works to completion.

The view is taken from the west and exhibits the side of the works. They are situated upon the bay, at the foot of Chestnut street, and face the lake. Water is taken from the lake, one thousand feet from the shore, and conveyed by a conduit in a pier to the pump wells in the engine house. The pier is cut by a number of sluices; thereby insuring pure water at the inlet, which is thirteen (13) feet below the surface of the bay. The water is raised into the standpipe by means of two (2) Cornish Bull engines. They are upright engines, and measure, from the bottom of the bed-plate to the top of the cylinder cap fifty-two (52) feet, they are exactly alike. The steam cylinders are sixty

(60) inches in diameter, and the pumps twenty-one (21) inches in diameter, the length of stroke is ten (10) feet.

These engines are driven by eight (8) double flue boilers, each, forty-two (42) inches in diameter, and thirty (30) feet long.

The pumping capacity of the works is 4,000,000 gallons in seventeen hours, running the engines at twelve strokes each per minute; they can be worked with safety to a speed of sixteen strokes per minute, thus greatly increasing the supply.

The engine house was built to accommodate the engines; it is 30' \times 35', and 65' high, built of sandstone and brick. The walls are very heavy, to sustain the weight of the engine, which is done by means of wrought iron beams and columns. The boiler house is 50' \times 60' and 12 feet high to the square of the roof, this is of brick with sandstone dressings. The stack is 100' high and has a draft of 25 square feet.

The most imposing feature is the standpipe, (the highest in the world.) it is a straight, wrought iron tube, 5 feet in diameter and 217 feet high, resting upon a cast iron base plate. This pipe is used to equalize the flow of water from the pumps, all shocks or waves being lost in it, and as the city did not feel that at present it could afford a reservoir, a uniform pressure upon the street mains is maintained by this standpipe. Its mode of construction was similar to the Irishman's who built his house by holding up one brick and laying another under it. For the upper sheets were rivetted together and held up while the next series were attached below, and thus the pipe was slowly raised by adding to the bottom until it was complete and rested upon its base.

On account of the cold and stormy weather at Erie, the standpipe is enclosed, and a spiral staircase passed

around the iron pipe, and between it and the enclosing wall, whereby visitors can reach the summit and enjoy a grand view of the city, lake, and the country for miles which can there be had. For those more timid a less elevated lookout is provided on top of the engine house. Mr. Birkinbine, the engineer, can boast of not only introducing the use of the standpipe into American waterworks, but of constructing the highest. The first he erected at Germantown Water-works, in Philadelphia, in 1851; it is one hundred and thirty (130) feet high. The second at West Philadelphia Water-works, in 1854; it is 130 feet high, with a spiral staircase surrounding it. The third at Kensington (Philadelphia) Water-works, 170 feet high, handsomely ornamented at the top. The fourth at Camden, N. J., with a finial covered with patent metal, and last but largest at Erie, 217 feet high.

The works were commenced April 15, and started December 25; 14 miles of pipe were laid, with the requisite fire plugs, and street stops, and the city of Erie has the comparatively small bill of less than \$350,000 to pay for a good and efficient supply of water. Already the works have paid their interest in checking fires in the city—several times by plug streams alone—as the head of water is sufficient to throw a stream over any building in the city.

The Cornish engines are generally considered as being divided into two classes, "*Beam and Bull.*" The first named class are constructed with a heavy beam working either above, on the sides, or below the cylinder, one end being connected with the piston-rod, the other with the pump plunger. The *Bull Cornish engines* are constructed without such beam, the cylinder being inverted and placed immediately over the pump, and the piston-rod directly connected with the pump plunger.

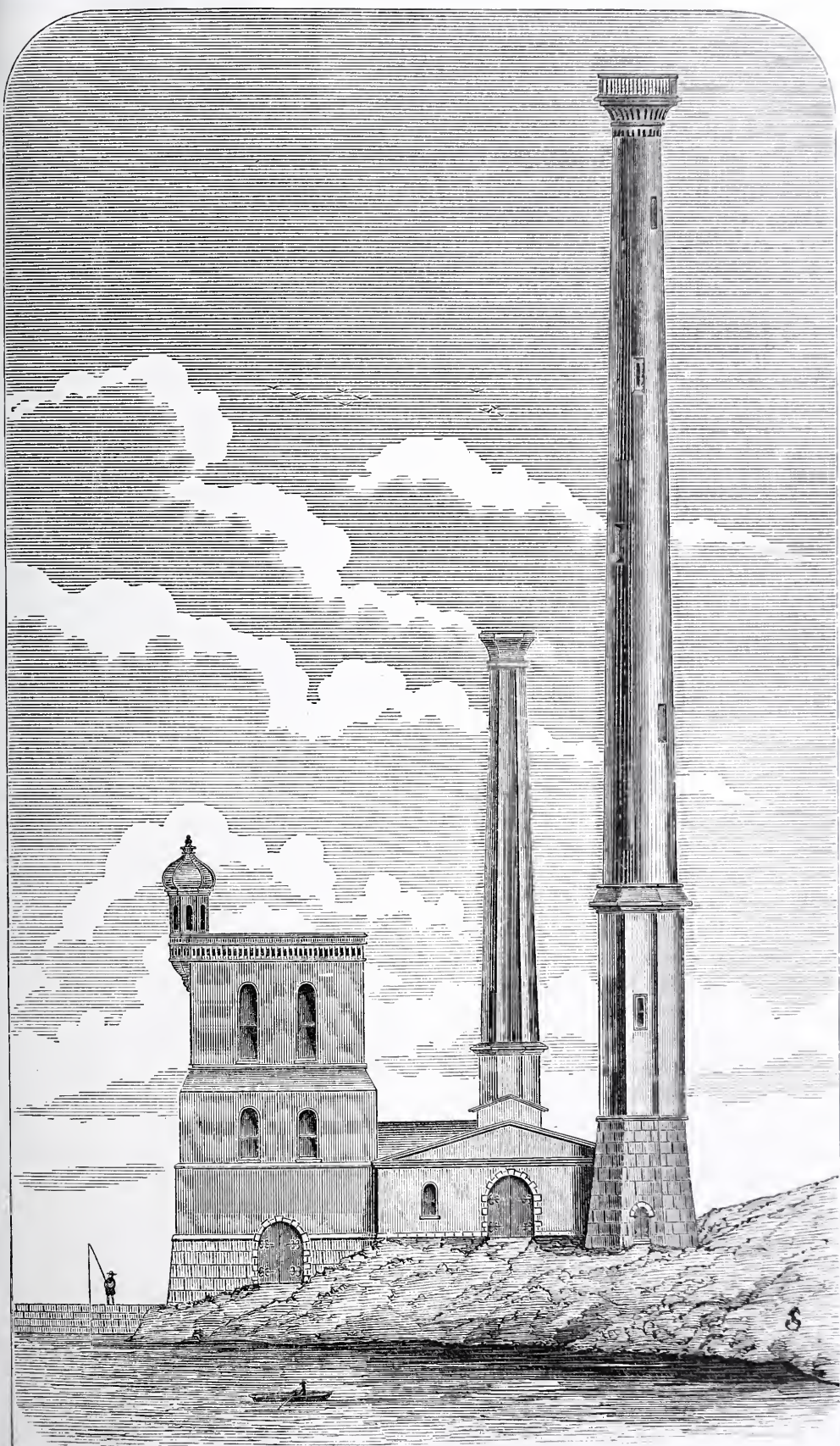
The engines in the Erie Water-works are of this latter class.

The Cornish engine is single acting,

receiving live steam upon one side of the piston only, and was originally designed by that great inventor, James Watt. It is used very generally in England for raising large amounts of water for supplying cities or draining mines. The name Cornish was given to it on account of the almost universal use of this style of engine in Cornwall mining districts. In this country it has never been popular, but it is now rapidly making friends among our engineers, and if in future years, it can maintain the present reputation as the most efficient and reliable and least expensive (in the amount of fuel required to do the same work) pumping machine—we may look upon it as our great stand-by for lifting water. Already we have quite a number of Cornish engines in use. Philadelphia has five; Easton, Pa., one; Louisville, Ky., two; Cleveland, Ohio, two; Jersey City, two; St. Louis, two; and Buffalo, two; besides there are several of considerable size in use by private corporations, draining mines or supplying canals.

Surely Erie is ahead in water works, and we are proud that it is indebted to a Philadelphia engineer for this superiority.

THE THAMES TUNNEL, commenced in 1824, by Sir Isambard K. Brunel, and after many difficulties completed and opened in March, 1843, has been closed as a public footway. This tunnel cost \$3,000,000, and never paid interest on the investment. It was never used as a means of transit under the Thames, between Rotherhithe and Wapping, but was visited as an object of interest. One of the roadways was closed, and the space between the arches used as shops, for the sale of fancy articles, purchased merely for mementoes. On July 21st, the tunnel was closed, having been purchased for the sum of \$1,000,000, by the East London Railway Company, for the purpose of running their trains into London.



WATER-WORKS BUILDING, ERIE, PA



THE PROPOSED TUNNEL BETWEEN FRANCE AND ENGLAND.

THE most important of all the important questions connected with the Channel tunnel is the nature of the ground to be traversed. If this be not too difficult of excavation, and fairly water-tight, that it may be laid down with safety, there is nothing to prevent the construction of a tunnel at reasonable cost. The only investigations intended to satisfactorily settle this question are those of M. de Gamond and Mr. Hawkshaw, and the last are unquestionably the more valuable of the two. This gentleman's boring on the English coast was satisfactorily completed last year. It was carried through the chalk into the green sand at the depth of 540 feet below high water. The boring on the French coast was continued from the surface to a point about 520 feet below high water. It passed through the upper chalk into the lower or gray chalk. This also was completed at the end of last year. It was Mr. Hawkshaw's intention to have carried the boring entirely through the chalk, but in attempting to substitute larger boring tubes, the hole was accidentally filled up with sand and shingle from the top. The results, however, arrived at seem sufficient to lead to the deduction that at the site of the boring the chalk would extend to, and the green sand be reached at a depth of about 750 feet below high water. It must not be hastily assumed that any part of the Channel within even reasonable limits will be equally suitable for the construction of the tunnel; on the contrary, it appears that within only a comparatively moderate area is the geological formation the best possible for the intended purpose.

It has been decided by the engineers, and we think prudently, that to ensure success the tunnel must run through the lower or gray chalk, which is much

more impermeable to water than the upper or white chalk. The gray chalk has a mean thickness of 55 to 65 yards. It crops up at Cape Blanc Nez and near Folkestone, while at Calais it lies 273 yards below the level of the sea. "In this situation," says the report of the Imperial Commission, "its composition is uninterrupted, free from fissures, and possessing, on account of the marly beds which are intercalated with it, a degree of plasticity which the engineers would expect to be maintained. The gray chalk appears to be very regular, and its thickness gives a certain latitude for the maintenance of the tunnel in the same direction even where the level of the bed undulates."

In the words of the engineers, "the principal practical and useful results that the borings have determined are, that on the proposed line of the tunnel the depth of the chalk on the English coast is 470 feet below high water, consisting of 175 feet of upper or white chalk, and 295 feet of lower or gray chalk; and that on the French coast the depth of the chalk is 750 feet below high water, consisting of 270 feet of upper or white chalk, and 480 feet of lower or gray chalk; and that the position of the chalk on the bed of the Channel, ascertained from the examination, nearly corresponds with that which geological inquiry elicited. It also appears probable that there is no great fault or serious interruption in the continuity or regularity of the strata between the two shores on the proposed line of tunnel." The proposed line is based on these facts or assumptions, whichever they may be. On the French side it starts at a point about half way between Calais and the little town of Sangatta, from which it runs straight across to the South Foreland. Having regard to the geological formation of

the Channel bottom, this appears to be the only locality in which the tunnel can be run with the hope of success.

It has been proposed to utilize the nearly submerged Varne as a place for a shaft. But a line run from Wissant to Folkestone, through the Varne, would also cut the green sand, full of water, and would traverse various formations besides the chalk. A line from Cape Blanc Nez to Folkestone would be the very worst which it is possible to adopt, while a line from Blanc Nez to Dover would be very little better. The route being settled, it remains to be seen how the work is to be carried out. The only difficulty, if the strata are dry, will lie in providing ventilation and taking away the spoil. In the chalk the rate of progress will be determined solely by the velocity with which the *debris* can be got rid of. A multitude of plans for effecting the ventilation of a channel tunnel have been brought before us from time to time; some bad. In our opinion the only one which holds out hope of complete success is that of Mr. Low. He proposes to drive two headways about seven feet square, side by side, at a distance of 50 or 60 feet apart, right across the Channel. The ventilation will be effected by leading air by a downcast shaft into one of these, and by an upcast shaft out of the other. Communication will be established by means of cross headings between the two. To us Mr. Low's expedients appear quite capable of supplying all the air required to the men working in the draftway. The draftways once finished no difficulty whatever would be experienced in enlarging them into fine tunnels.

The conclusions of the French Commissioners, stated in the fewest possible words, are, first: that driving a submarine tunnel in the lower part of the gray chalk is an undertaking which presents reasonable chances of success; but, secondly, it is possible that a fault may be encountered which will ruin the whole

scheme; thirdly, that the Commission are not in a position to fix any sum as the probable cost of the tunnel; fourthly, that the cutting of preliminary draftways appears the surest means of ascertaining the possibility of the undertaking and the nature of the difficulties to be dealt with. They also think, fifthly, that the cost of the tunnel draftways should not exceed two millions sterling. Up to this point the Commission were unanimous. Here came the split.

Resolution sixth, according to three of the members, including the president, was to the effect that the respective Governments of France and England should guarantee the money required, because the tunnel was wanted, and would pay. The other three thought that the tunnel was not wanted, and would not pay. They were of opinion "that the proposed undertaking appears to be incapable of producing sufficient remuneration for the capital employed; and thus looking at it from the purely economical point of view, and setting aside considerations which the Governments are more competent to decide on than the Commission in the present case, at this moment there are no grounds for recommending the acceptance of the propositions of the Committee.—*London Engineer*.

A BLOCK OF GRANITE of unprecedented size has recently been quarried at Monson, Massachusetts. This slab is 350 feet long, 11 feet wide, and 4 feet thick, containing 15,400 cubic feet, and weighing twelve hundred and eighty-three and one-third tons. To cut it from the rocks, 1104 holes were drilled on a line parallel with the front edge. This ponderous piece of granite will be cut up and sent to Albany, to be used in the construction of the new capitol buildings.

BRICKWORK IN GENERAL.*

BY H. H. HIGGINS, ARCHITECT, ATHENS, ALA.

BRICKLAYING is an art, the theory of which has, as a general rule, not received that attention it deserves; not so much for the want of capacity in those who engage in the business as inattention and general disinclination for study. Another reason is traceable to the fact that there are many bricklayers who think that the art of laying bricks is so very simple and easy to acquire, that really there is nothing to learn more than the mere training of the hand, thereby giving the brain no part of the work to perform.

In the first place, every one who expects to attain a proficiency above mediocrity should learn as much of chemistry as will enable him to analyze all materials necessary in his profession, simply because it will enable him to judge and select for himself that which is best.

We will now give a synopsis of our own experience on the subject, after a close investigation on the theory and practice combined of over forty years: yet, as simple as it is, we find the science is by no means exhausted, and that there is much remaining yet to be learned.

As the foundation is one among the many important items in the process of building, we will treat of it first, and then proceed to others as they suggest themselves to our mind. The ground on which the walls of a building are to be erected should be excavated until a uniform density (if possible) is obtained. In building upon level ground, or an in-

clined plane, as the ground rises, a series of horizontal steps should be formed according to the length of the wall and the abruptness of the ascent. After the trench has been formed, it should be thoroughly rammed with the butt-end of an iron crowbar, or a heavy wooden rammer, the end of which should not exceed two or two and a half inches in diameter. This ramming process should be attended to strictly, notwithstanding the earth may present a hard and uniform appearance; because there are at least two advantages to be gained by it. The first of which is that all soft and imperfect places are discovered and remedied by ramming in hard and solid substances; or by spiling and planking. The second is the hardening of the earth in a more uniform degree all around, thereby causing less settlement throughout than otherwise would occur.

One item just here we will guard young builders against. It frequently occurs in large towns and cities that old brick buildings are removed, and the old trench or foundation cleaned off for the purpose of beginning a new wall thereon; at the same time the new house is to be enlarged by building a part of the wall on the same ground on which the old walls were built, and another part of the wall or walls extending on to newly opened trenches, in all such cases the newly opened trenches should be particularly well rammed, whilst the old part should not, unless it be that some defective place should be remedied according to its requirements. If these precautions are not attended to, the wall or walls on the newly opened trenches will settle down, whilst the work on the old will remain permanent, thereby causing a crack in the wall at the junction of the old and the new foundation.

* This essay, kindly furnished us by the author, General Higgins, was written during the late war, on *wall paper*; the ports being closed, no other paper could be had for the purpose. The subject is fully treated by a thoroughly competent hand, and we only wish that other practical men would follow the excellent lead of our worthy contributor, and give the fruits of their valuable experience to the pages of the ARCHITECTURAL REVIEW, as he has done.

When a defective place is discovered, the nature of which is such as to prevent its being made secure by the ordinary process of ramming or spiling, in such case the only safe expedient is to turn an arch over the defective place.

One other item we will mention as regards foundations: When a trench which has been opened is to be filled with bricks as a foundation wall, the dirt which has been thrown out in digging, should be thrown back again as the wall is being built, so that the workmen can tread upon it and press it back on each side of the wall. This should continue until it is raised slightly above the level of the earth which surrounds the house. This precaution is necessary, in order to prevent the water penetrating the trench, which would be the means of softening the ground, and thereby causing the walls to settle. Many walls have been sprung and cracked by neglecting this seemingly unimportant matter.

We would here recommend that semi-circular inverted arches be turned under all openings. The centre of each should rest upon the ground, or immediately on the top of the footing. The reason why these arches should be inserted is so manifest that we deem an extended explanation unnecessary. We will, however, make a few remarks in vindication of the practice. In the first place, we know it is an almost universal principle in building, that openings (windows and doors) of the second story are placed immediately over those of the first. The same of the third being placed over the second, and so on for each succeeding story, thus forming two distinct features in the face of the work; one of which is a vertical row of windows extending from the lower to the top tier; the other is a row or column of vertical solid work, extending from bottom to top. Now, it is plain that the row or column of solid work is heavier than the space occupied by the windows; and being heavier, is more liable to settle

into the earth on which it stands than the lighter part of the wall occupied by the window. If an inverted arch be turned so as to extend from one solid row or column to another, and each end of each solid row resting on the extremity of each arch, then it appears plain that if the row of solid work settle down, they would at the same time necessarily force the arches down also. Thus the settlement becomes equal and uniform, the pressure being just the same under the arch as under the centre of the pier or row of solid work. This brings us to a further consideration of foundations. We would recommend that in all cases the whole of the earth be removed from under the house as far down as the bottom of the trench, because, by so doing, a greater space is made for the free circulation of dry fresh air, which is very important for the preservation of floors, beams, grate-frames, lintels, etc. After the earth upon which each wall of the house is to stand has been thoroughly rammed, then level the surface to as perfect a plane as is possible, so that each brick, when placed thereon, will lie perfectly level and firm on the ground, without any oscillation whatever. If the surface is of such a character as to prevent its being brought to a smooth level plane, then lay the first course in hydraulic cement, if it can be conveniently had; but if it cannot be procured, then lay it in good lime and sand mortar. We prefer the cement, because it hardens in wet or damp situations in a few weeks, whereas the lime and sand mortar would require as many years to acquire the same degree of hardness if put in the same situation. We cannot lay down an invariable rule for all situations as to the breadth of footing, and thickness of walls, but will give one example by which others may be adjudged according to circumstances. We will therefore suppose that a brick house is to be built on ground of solid, uniform density fifty feet long by twenty feet wide,

having one or more partition walls, two stories high, with a cellar story of eight or nine feet in height; the trench on which the walls are to be reared, prepared as above directed, we would then commence the first course five bricks broad for the exterior walls. For the second course, set in two inches on each side of each course until the footing is reduced to two bricks thick, which thickness continue up to the top of the cellar. Lay the first course of the partition wall or walls three bricks broad; the second course set in two inches on each side, as on the exterior wall footing, until it is reduced to one and a half brick thick, which thickness continue to the full height of the cellar. If chimneys are to be introduced, make an additional footing of eight or twelve inches, according to the required size of chimney.

At each corner of the house make a prolongation of the walls each way, so as to form a cross; let these prolongations or projections be extended beyond the first course of footings about thirty-six inches, and three bricks wide; then set in two inches at a time on each side of each course until reduced to two bricks thick, and on an exact prolongation of the main walls, of which they are part. The ends will be reduced two inches on each course, from the beginning, until brought back to the true corner. These projections at the corners act as braces and secure them against a tendency to settle faster than the other parts of the wall.

The exterior wall of the house above the cellar should be one and a half brick thick throughout to the top of the second story, running the wall up through the top tier of joists. One brick will be sufficiently thick for the gable ends and partition walls, provided the work is executed as hereinafter specified.

By an examination of brick buildings, if the walls are cracked at all, it will be found under the windows or door-sills; and particularly at or near the outer

corner of the window nearest the corner of the house. Why is it that those cracks are to be found in these particular localities? Simply because the piers are heavier than the spaces occupied by the windows, and settle more particularly at the corner, which is heavier than the middle piers and settles more than they do. Therefore the greater probability of finding a crack at or under the outside window, which might be prevented if foundations were prepared and built according to the rules herein laid down.

The laying of wooden bricks in buildings, in a substantial and proper manner, is a matter worthy particular attention, because it has been most shamefully neglected by a very large majority of workmen. To accomplish this very important and useful auxiliary to joinery in the best manner with which we are acquainted, the timber should be well seasoned and cut into lengths and widths of the common bricks with which they are to be worked. Their thickness should be the same as the common bricks, with the addition of the thickness of two mortar-joints added on; as all wooden bricks should be laid without mortar, either at bottom or on top. All common bricks coming in contact with the wooden bricks should be firm, hard, and well burnt; laid level, and firmly bedded in good mortar. The wooden bricks should be laid nicely to a line as well as all others of the inside courses. The common bricks which are laid at the back of the window bricks should be well bedded in mortar, and placed closely up against them; then the next one firmly against it, and so on.

The reason for thus placing the common bricks firmly against the wooden bricks is to prevent their being forced from their position by the concussion of the hammer when being nailed to. Their being surrounded by firm, hard bricks there is less probability of their crumbling or giving way, owing to heavy blows on the wooden bricks. If

then the ends of these wooden bricks were cut out in the shape of an internal obtuse angle, and common bricks moulded to fit the angle and work the brick thus moulded, closely and firmly into the angles, it would be a further security against being forced into the wall, and also against being pulled out. In working up the jambs of doors and windows, the same precaution should be used in every particular. If the jambs are splayed, the wooden bricks should be cut to fit the splay.

FIREPLACES AND FLUES OF CHIMNEYS will next claim our attention—a subject of much importance in the construction of houses, not only as an ornamental accompaniment, but of real utility. The size of an ordinary fireplace for burning wood is about three feet wide in front, and two feet four inches on the back; the depth from front to back about fourteen inches, the height from the hearth to the arch-bar about thirty inches. This will prove a very good size for country houses, and will answer for suburban residences, yet a few inches more or less is not material.

In the execution of the work of a fireplace, care should be taken to select materials best adapted to the resistance of heat. If fire-bricks can be had, they ought to be used; if they cannot, then select sound bricks which have been but partially burnt, (by workmen called salmon, because they are of a yellowish-red color,) and lay them in clay mortar, mixing with it a small quantity of sand. These bricks are laid in clay mortar, because fire has a tendency to harden it; whereas if laid in lime and sand mortar, the fire disintegrates it, as all experience proves, without going into a detail of facts to explain why it is so. The front part of the jamb, also the bricks on the front corners of the jamb, should be laid in lime and sand mortar, and in fact all bricks in and about the chimney, except those which come immediately under the influence of the fire. In laying the bricks, great care

should be taken to bed them firmly in the clay mortar, forcing them down to a close joint, the mortar of the vertical or heading joint should be thrown up so as to cover the whole end of the brick; then in laying the bricks care should be taken to force them closely on the heading joint. The making of a close, firm heading joint is necessary, because being placed in a vertical position is more liable to fall out, leaving a vacuum for the fire to penetrate, thereby losing a portion of its heating influence; also, causing premature destruction of the work. If a projecting or Franklin back is desired, the work of the back should be carried up plumb eight or nine inches above the hearth; then begin the projection, and let it be on a straight line, without bulging out or curving in. The first of these faults would render the work more liable to fall out; and the second would render it more liable to force the smoke out of its proper channel. If these Franklin backs* are to be built, it would be far better for the durability of the work, to mould bricks with a bevelled edge, expressly for the purpose, as they could be laid level, instead of placing them on an inclined plane as is usually done. After a close investigation of many years on the subject, we have come to the following conclusion relative to Franklin backs: By them, the draught can to some extent be increased, but this small advantage is overcome by the greater trouble and expense of repairing that kind of work, for one plumb back will generally last as long as four of the other kind. We have already described the manner of laying the bricks which come under the immediate influence of the fire; we will now make a few remarks relative to the filling in, as it is termed by workmen. After the course next the fire has been laid, as before described, the filling in should be done, by laying the first

* These backs were first brought into notice and used by Count Rumford, of England, long before Franklin's day.

course of the filling in as close to the fire course, both back and jambs, as the bricks can be placed, which is just as easy to do as to leave a vacancy between the two courses; the jambs with bricklayers are more frequently neglected in this respect than the back, because they think it easier to begin the filling in by laying the brick next to the outside course, as in that case, the work is all square, and the finishing of the course works out against the splay of the jamb, which is generally filled up with small pieces of brick thrown in loosely, or any way so as to fill the space. The reason for thus laying the filling in courses close up against the fire course is, because they support it. If a stick of wood be carelessly thrown on the fire, striking the back or the jambs with force, then, if the fire course is well supported by the filling in, there would be less probability of its being forced from its position than if standing alone; two, three, or four bricks being laid firmly up against each other, would certainly be harder to force out of position than one single brick.

The flue of the chimney comes up next for consideration. After the back of the fireplace has been carried about one course above the arch bar, drop back to four inches thick, which is the outer course. All filling up at this point, as is frequently done to make a kind of slope or inclined plane, is detrimental to the draught of the chimney. The wings or sides should be gathered over from the arch bar up, until the flue is reduced to about one hundred square inches, which is amply sufficient for a three feet fireplace. Philosophers tell us that heated air is lighter than cold, which at once explains the reason for the smoke ascending through the flue of a chimney, as the air which surrounds the fire becomes heated, it begins to ascend, when the cold air rushes in to fill the vacuum thus made by the ascension of that which was heated. Thus the cold air continues to rush in, and in turn be-

comes heated and light, and passes off. This appears to be the true philosophy of its ascension.

Now we should construct the flues of chimneys so as to present as few obstructions to the passage of this heated air as possible, because the smoke is taken up with it. It is not very material how many turns and crooks are made in the flue, so that it is kept as near the same size as possible, but all projections should be made on a straight line, and by no means to curve upwards, because the smoke in its ascent would naturally follow the curve, and when at the top, would still have a tendency to progress in the curvilinear direction, which would at least to some extent retard its upward course. We at the present can make no better illustration of the matter, than comparing it to a current of water flowing with rapidity down a bend in the river; it sweeps around the curve, until it reaches the point where the stream takes another direction, but on account of the circular motion of the water produced by the curve, it is forced to a considerable distance diagonally across the stream, thereby an eddy is formed just below the point or turn in the stream, which point corresponds precisely with the top of the projection in the flue, where an eddy of air is formed in the same manner as was done by the stream of water. All flues should be smoothly plastered, because the soot is less inclined to adhere to a smooth surface than a rough one. All flues in the same chimney should be kept separate until they reach the top, because the fireplace with the greater fire, would always force aside the smoke in the flue of the one having the smaller.

In order to secure the execution of the best work, all bricks should be saturated with water just immediately preceding the laying of the same; this precaution is more particularly requisite in warm dry weather, and with bricks which have been but recently burnt. The

reason why the bricks should be wet just immediately previous to being laid is—by wetting, the pores of the bricks are filled with water, therefore cannot absorb the water contained in the mortar. If laid dry, the water in the mortar is immediately absorbed, by capillary attraction, therefore the surface of the mortar becomes dry, and, of course, little or no adhesion can take place between two dry substances; also, the dry sand and dust on the bricks would naturally prevent adhesion; whereas, if wet, the water in the mortar and that on the bricks would more readily affiliate and thus become united. This wetting is of great importance, and should by no means be neglected if good work is desirable. Bricks which have been burnt for a long time previous to being laid, make a much better wall without being wet than bricks recently burnt, because the damp atmosphere has to some extent filled the pores of the bricks, thus supplying in a small degree the place of water. If bricks are laid in cold weather, then it would be better not to wet them, because when wet they require a longer time to dry, therefore much more liable to freeze, which is more detrimental to work than the deficiency produced by laying them dry. But we would here recommend that no brick work be done in freezing cold weather. In laying bricks, the mortar should be spread in such a manner that the whole bottom surface of each brick should come in contact with the mortar so as to adhere to it. To accomplish this all-important matter, the bricks, when first placed on the mortar, should, with a very quick motion, be firmly and steadily moved back and forth, at the same time pressing it firmly down with the hand, then if not sufficiently settled down to the line, strike it a lick or two with the edge of the trowel, at the same time holding the brick in a steady firm manner to the line; this is done to prevent breaking the adhesion which takes place at the time, whereas, if they were

brought down to their places in an unsteady oscillating manner, the adhesion would be destroyed. This is by no means the most speedy mode of laying bricks, but is certainly much more durable than the mode now practised by modern workmen, whose superior excellency (as they conceive) consists more in the quantity than in the quality of the work. But they who are able to build a brick house would certainly rather pay the difference that exists between good work and inferior; so in the end it would be no disadvantage to bricklayers, and a very great advantage to the owner of the work. The modern mode of work is as follows: the workman throws the mortar on the wall with the trowel to the length of from five to ten feet, being governed in this by the quality of the mortar, after which the workman turns his back to the direction he intends to go,—puts the point of the trowel on the centre of the mortar, in its longitudinal direction,—walks backwards, drawing the point of the trowel through it from one end to the other, thus leaving a cavity or trench in the mortar; it is then slightly cleaned up—striking off the overplus which hangs over the edge or face of the work, and adding to or spreading out some places which are deficient in quantity, after the mortar has been brought to the required shape, the trench still remaining as at first made with the point of the trowel, the process of laying down the bricks then begins. The workman first selects his bricks and lays them on the wall a few inches in rear of the line of mortar,—stringing them out the full length of the mortar. If he be a right-handed workman, he turns his face in the direction he intends to go, which is from left to right; this brings his left side to the wall: he then takes up the first brick with his left hand, his thumb extending over the upper front edge, and his fingers clasping the back edge; in this position the brick is brought down to the mortar, when a very slight pressure

with the left hand settles it to the line; the surplus mortar forced out by the pressure of the brick is cleaned off with the trowel, and a portion of it wiped up against the far end of the brick just laid; this operation is repeated for the next brick, and so on until the mortar thus spread is all covered with bricks, when the mortar is again spread as previously described. Thus, when the course is finished, there is a space of from one and a half to two inches on the bottom of each brick which has not been touched, in consequence of the trench in the mortar made with the point of the trowel. In addition, the mortar joint having been so slightly pressed in laying the brick on it, is quite porous and subject to crumble, or at least settle when weight is laid on it. We have faithfully tried to explain the two modes of laying bricks; the latter of which is the almost universal practice.

We will now try to illustrate, by a very simple comparison, why the former mode is far superior to the latter. For instance, suppose we wish to unite two pieces of wood together with glue in the most substantial manner; the process would be to cover the part to be united with the glue *all over*, the other piece would be laid upon it, and firmly and steadily rubbed back and forth until the surfaces of the two pieces are brought in close connection with each other, in which situation it remains until dry; thus the whole face of each piece would receive a portion of the cementing mucilage. Now let us try the modern theory and practice of uniting two solid substances. We will suppose we have two pieces of timber to be glued together, of the size of two bricks; we will take one of the pieces and spread the glue on it an inch broad from one end to the other, both front and rear, leaving a space in the centre two inches wide entirely bare; now we will lay the other piece on it lightly, without rubbing it down, and let it dry in this condition. We need hardly ask the question which

of the two modes you prefer. Now, if the first mode of uniting two pieces of timber is better than the second, then by the same process of reasoning, we must come to the conclusion that the first mode pointed out for bricklaying is superior to the second.

The best mode of striking or smoothing a joint, is to make it as flat and flush as possible, that is, without tucking in the lower edge, as is often done. There are at least two reasons why it should not be done; the first of which is, that the top edge of the brick when left bare serves as a kind of lodgment for the falling drops of rain, which is more or less absorbed into the joint, and into the top edges of each brick, which in a short time begins to mould and turn black, on account of the quantity of water thus absorbed, which gives to the work an old appearance prematurely. The other reason is, the face of a wall with a deep tuck joint, looks rough and ragged when new, and when old begins to decay, in consequence of the water settling into the joints.

A few words on the subject of bonds would not be inappropriate, although this article has been extended to a greater length than was at first contemplated. There are now three kinds of bonds common among workmen, to wit: Flemish, English, and American. The Flemish is executed by laying a header and a stretcher alternately in the same course, the header being laid on the stretcher below; this leaves two inches on each side of the header as a lap for the end of the next stretcher. This bond is begun by putting in a two inch closer next to the header which is on the corner, then laying a stretcher next to the closer, and a header next to the stretcher. The next course begins on the corner with a stretcher, and then a header next to it, and so on alternately throughout the course.

Some workmen put a three-quarter bat on the corner, and lay a header against it, which is equally as good as

the first named plan, and probably looks somewhat better.

The English bond is executed by running every alternate course a header. It is important in working this bond, that the bricks should be made to a correct size, otherwise trouble would be experienced in preventing the bricks from working joint over joint—if too wide for the length, the consequence would be that either a closer or a three-quarter bat would have to be put on every few bricks to prevent the working as above; if too narrow, the same thing would occur by falling behind, when the same remedy would have to be applied. To avoid the trouble of putting in these closers, or three-quarter bats, the bricks should be moulded nine inches long, by four and seven-sixteenths inches wide, (as to the thickness it is not material so far as the bond is concerned.) The American bond is executed by running three stretching courses, and the fourth one a header, which is laid with tile bricks, which are moulded nine inches square, and their thickness the same as the common bricks with which they are worked. This is certainly the neatest and best bond yet worked. We have taken the liberty of calling it the American bond, as it was first used in America, so far as our knowledge extends. We will here guard young and inexperienced workmen, also persons for whom work is being done, against working the American bond as it is usually done, which is as follows: from ten to twelve, and sometimes as many as fifteen courses are run before a heading course or tie of any sort is made, then in order to the running of a tying-in course, each back corner of each brick is clipped off to within an inch or thereabouts of the face, when laid, the vacancy thus formed by the clipping is in shape similar to an imperfect right angle, the point of the angle in the direction of the front. In filling in the course thus clipped and laid, the end of a brick is cut to a shape so as to partially fit into the angle thus

made, which gives a lap of about two or two and a half inches; this lap it will be observed is the point of a brick which has been trimmed to fit in the angle. Some workmen, instead of trimming the end of a brick to an angular point, turn a whole brick in a diagonal direction, thereby placing a corner of it into the space formed by the clipping of the corners. There is another mode practised by some other workmen, which is something better than the above, but still very imperfect; it is, to put pieces of hoop iron about ten inches long, provided the wall is a brick and a half thick, two on each brick, placing the ends of the iron within about a half inch of the front, extending at a right angle back on the wall. As we have given our views as regards the flimsy, imperfect manner of executing the American bond, we, of course, feel bound to point out a remedy, by giving a better. If pressed bricks are to be used for the front, have tiles pressed also; if common bricks, then have common tile bricks moulded to work with them; and in laying either kind, let every fourth course be laid with these tile bricks. The remedy is easy, and really done with greater facility than either one of the imperfect modes pointed out above.

Grouting is a very important matter in the building of brick walls, and by no means should be neglected, because the grout fills all the interstices, and unites the separate substances into one common and solid mass, which cannot be done so readily in any other way. "Where there is unity there is strength." The advantage to be gained by grouting far overbalances the cost and trouble of doing it.

Toothing a wall is a bad practice, and should never be resorted to; it would be far better, as regards strength, to raise up a square plumb block rather than tooth, but neither should be done. In raising a corner, run out far enough to rack back instead of working up

toothling. No one part of the house should be raised more than one scaffold high without bringing all the other walls to the same height. This will insure a more uniform settlement, and thereby produce less danger of springing or cracking the walls. The course on which sleepers, or joists, or any other timbers are to rest, should be carefully laid precisely down to the lines, with firm hard bricks, and the timbers should rest on them instead of a torsel, as is too often done. The reason why the bricks are better than the torsel is, the plank or torsel breaks the unity of the wall at that place, and should the house burn, the torsel would be destroyed, thereby creating a vacuum in the wall as much as the width and thickness of of the torsel. The wall at that point, having nothing to support it, would, of course, settle down to fill the space, which would either throw it down or spring it so as to render it of no further service. Arches should be turned over all lintels, as in case of fire, the walls will be preserved thereby. Bond timbers, many years since, were worked into walls, and some of the English architects yet persist in the practice, but they are detrimental to work in proportion to their size; the smaller they are the better for the work, because to the full size of the timber is the unity of the wall destroyed. If bonding were of bar iron, well coated with some material which would prevent oxidation, it would be really serviceable in many situations. We would here recommend that iron, either wrought or cast, supply the place of wooden lintels over ordinary sized openings.

The size and shape of bricks have undergone many changes and modifications since the first discovery of the art of making them, which, according to tradition, was anterior to the flood. Those in almost universal use are the Flemish, and are, taking all things into consideration, the best, because they combine more advantages and fewer

disadvantages than any other form yet discovered within the range of our knowledge. The advantages are, first, the size and shape render them convenient to handle; and, secondly, less difficulty in making, drying, and burning; also, a sufficient amount of strength. So far as our knowledge extends, neither tradition or history make any mention of the size of those made by the Antediluvians, nor those made by the ancient Babylonians for the Tower of Babel, nor of those made by the Jews while in bondage with the Egyptians. The Grecians used several kinds of bricks, but chiefly the Didorons, which were about six inches square; Tetradorons, twelve inches square; and the Pentadorons, which were five palms or fifteen inches. The Romans began to build with bricks towards the decline of the Republic. Pliny says those most in use were eighteen inches long, and one foot broad, the thickness not mentioned. Mr. P. Nicholson, an eminent architect of London, England, says: "Bricks claim a decided superiority over stone, not only as being lighter and more easily worked, but also because their porous texture facilitates their union with the mortar, and makes them less liable to attract or retain damp and moisture."

Our own experience is, that a brick house, when properly built, is at least equal if not superior to one built of stone, and when we take into consideration the saving of labor, and consequently the saving of outlay, we would give it a decided preference.

But a brick house put up in the usual style of workmanship is by no means durable or good, and inferior to one the work of which is well done of stone. To conclude we would give it as our opinion that there is no reason why a brick wall properly built should not last a thousand years without any signs of decay, as some few specimens of Grecian and Roman work yet remaining most conclusively prove.

PENCILS AND THEIR MANUFACTURE.

THE current number of that useful and interesting New York monthly, "*Hours at Home*," contains a graphic and instructive account of the manufacture of Faber's pencils; and as our profession is so intimately interested in this subject, we subjoin it as extracted from a valuable paper in that periodical entitled "A PENCIL SKETCH, by Professor EVANS."

"We first enter a large basement-room containing two rows of huge vats placed in a descending series, like steps. One row is devoted to the purification of the graphite, the other to that of the clay, and the process is the same for both substances. The raw material is thrown into the first vat, and a quantity of water added; the mixture is then thoroughly stirred and afterwards allowed to settle, when the valuable ingredients rise to the top, or remain in succeeding strata, while the earth and stones sink to the bottom. A plug is then withdrawn about midway in the vat, and the thickly impregnated water falls into the second receptacle, while the mass of mud remains in the first. In this manner the material passes through water five times, when it has become sufficiently pure to be poured into a bag of thick cloth, which is subjected to a heavy press until the water is drained away, and the lead or clay is left in a solid mass, when it is placed in iron pans and dried in a furnace. After the lead and clay have been dried and mixed in suitable proportions, water is added, and the mass is put into a mill consisting of rows of separate stones, occupying the whole length of a large apartment, and connected with a steam engine by bands running along the upper wall. Under each millstone is a tub to collect the mass which slowly escapes from the tremendous pressure, and falls in thick gray drops from the wooden

trough beneath the stone. This process is repeated ten or twelve times, when the mass is again dried in the oven. Afterwards it is laid upon a flat surface and hammered for a considerable time, then shaped into a cake and sent to the second press, from beneath which it falls in spirals of different sizes corresponding to the apertures through which it is pressed. These long spirals are collected and handed to operators, who sit before a table and busy themselves in straightening the still flexible cords by laying them into boards grooved to a corresponding size. The boards, when filled, are laid upon shelves just below the ceiling where the warm air of the room will have most effect. After a day or two the leads are placed in other hands to be cut to the required length for pencils, and carefully assorted: the perfect specimens are then laid in boxes and sent to another room, where they are enclosed in larger boxes of iron hermetically sealed, and subjected to the intense heat of a furnace-fire for five hours, when the lead is sufficiently tempered for writing purposes, and passes into the care of the workmen who furnish the wooden enclosure, though it must first bear the scrutiny of the faithful proprietor, who personally makes trial of a specimen of the contents of each box before he allows it to go forth under the stamp of his honest name.

"The refuse ends and broken pieces of lead are sent back to the press, where they become incorporated with a fresh mass, so that there is no waste of the precious material.

"We may now leave the lead manufactory and enter the long building appropriated to the workmen in cedar. As we ascend the stairs the air is heavy with the spicy perfume, and great blocks and slabs of the pink and white wood,

just as they were hewn in their native American forests, are lying in the passage. On opening the door which leads into the first workroom, we find ourselves in a cloud of dust and amid heaps of soft shavings, the work of the many fine saws which are revolving so rapidly in their frames as to appear stationary, while the hoarse growl of the machinery below is exchanged for a sharp buzz, as though gigantic bees and flies were endeavoring to escape from spider-webs as strong as a ship's cable.

"Here we see the whole process of cutting the wood for pencils; one workman holds the block under a saw which works with frightful force, and prepares the slabs for a more delicate machine which saws them to the proper thickness; another set of tools, also worked by steam, gives the requisite angles to

each half of the form; another makes the groove for the lead. The next room is furnished with tables, around which the workmen sit, each performing a special task according to a systematized division of labor, and then giving what he has finished to another until it thus passes from hand to hand through the successive stages of development; one lays the leads into its groove, another glues it over, a third applies the cover of wood and glues the halves together.

"In the room devoted to the final processes—the polishing, coloring, gilding, stamping, arranging and packing of the pencils—only women and girls are employed; it is the old story of Vulcan and Venus, though the harmonious union of the Useful and the Beautiful is perhaps better exemplified in the workmanship than in the workers!"

AN OLD NOVELTY.

MONSIEUR REVOIL, a distinguished French architect, has just turned up an idea which had obtained long before his apparent discovery of it. However, this is no fault of that gentleman; he has at least the practical merit of having brought into more public view an instrument which (at least, in principle) was already known, though little used, and the supposed discovery will at this advanced day of art-culture prove beneficial, in drawing general attention to a very simple yet most valuable contrivance by which architects and scenic artists can draw their desired objects practically near to them and ensure their perfect truthfulness. We quote from the *London Builder*, page 560 of the current volume:

"Teleiconography is a long new word, which we owe to the ingenuity of our French neighbors. It means, as those of our readers who are familiar with Greek will see at a glance, the drawing of distant objects. The French have a

right to coin the word, inasmuch as it indicates a new and admirable method, discovered by a French artist, by which a faithful delineation of objects so distant as to require the use of the telescope to distinguish their details, may be readily and correctly effected.

"M. Revoil, an architect well known in France, from having had charge of the restoration of the Roman remains at Montpellier, Toulon, and Nîmes, has recently been engaged in a special study of the early architecture of the southern provinces of the ancient kingdom. In the course of his attempts to arrive at exactitude of definition, by the aid at one time of the camera lucida, and at another of the telescope, he has been induced to make experiments as to the combination of the principles of the two instruments. The result of this effort M. Revoil has called the *Téléiconographie*.

"The principle of this instrument is that of allowing the image transmitted

by the object-glass of a telescope to pass through a prism connected with the eye-piece. The rays of light that would in the ordinary use of the telescope be transmitted direct to the eye, are refracted by this prism, and thrown down upon a table placed below the eye-piece. The distance between the prism and the table determines the size of the image projected on the latter, and it is easy for the observer to trace, on a paper placed on this sketching-table, the actual outlines indicated by the refracted light.

"The idea once grasped, it is easy to work out the details. The telescope is fixed on a stand with screws and clamps, allowing of both horizontal and vertical motion, as it may often be necessary to give traverse to the instrument, in order to make a connected drawing of a larger area than can be included in the object-glass at one view. In fact, an entire panorama can be traced, if the relative positions of the axis of the telescope and the surface of the sketching-table are undisturbed.

"We see no reason to doubt that M. Revoil's eyepiece might be adapted to the ordinary theodolite, so that any person who possesses one of these instruments may, at a small expense, obtain a good sketching apparatus.

"The advantage possessed by the Teleiconograph over the camera lucida is manifest. The size of the image may be determined at will by the person who uses the former, without any diminution of accuracy. We have before us a lithograph of the summit of one of the towers of Notre Dame de Paris. The 'croquis' was taken, by means of the instrument of M. Revoil, at the distance of about three hundred mètres. It is twelve inches long. A sketch taken by the aid of a camera lucida is drawn alongside, and is only one inch in length, or one-twelfth part of the linear measure of the bold outline of the Teleiconogram (as we suppose the new likeness will be called). Two mountain

peaks, in Provence, sketched by aid of the same apparatus, show how admirably it can be applied to the sketching of country. For the purposes of military surveying, its services promise to be of the utmost value.

"The Teleiconograph insures certitude in drawing, but it does not draw. It is an aid to the artist, not a self-acting substitute for his eye and hand. The sharp, bold touch of a master of the art of drawing will be as distinct from the feeble peddling of an inferior workman, when the refracting prism is used, as when freehand sketching is resorted to. The division of attention between the object and the copy, which is often so painful, will be entirely avoided by the use of this instrument. In the hands of a true artist the result will be every way admirable—exact as a photograph, without the distortion of all those parts of the field which are distant from the centre, and at the same time marked by all the peculiarity of touch proper to the master. The camera lucida, from its greater portability, will still hold its own, but we shall hope to see M. Revoil's instrument brought into familiar use in this country, to meet circumstances for which it is peculiarly adapted."

The following letter appears in that periodical the same month and may be found at page 602, headed:—

DRAWING AT A DISTANCE.

"The account which you have given in your number for July 17th, p. 560, of the manner in which M. Revoil—whose admirable work on the Romanesque Architecture of the South of France ought to be in the hands of every lover of Early Art—has combined the use of the camera lucida and the telescope, is interesting to every artist who desires to transfer to his sketch-book architectural details situated beyond the limits of ordinary powers of vision.

"Justice to others, however, who realized long ago what M. Revoil no doubt honestly believes to be a recent invention of his own, obliges me to resist the claim or originality in this matter to which you apparently lend your countenance in the article I refer to. Thirty-four years ago Professor Miller, of Cambridge, recommended to me the application of a small speculum, or steel mirror, of about the eighth of an inch in diameter, to the eyehole of an ordinary telescope, for the purpose of presenting,—after the fashion of the camera lucida,—when inclined at the necessary angle, and on looking downwards, an enlarged reflection, on a sheet of paper placed at a given distance, of any object towards which the telescope might be directed.

"I succeeded, after some trouble, in obtaining one of these small mirrors, from the watchmaker at Vienna who made them, and in adapting it, with Professor Miller's assistance, to a telescope of moderate power; and for seventeen years I used this instrument with the greatest advantage in all cases where the distance or the inaccessibility of the object to be drawn rendered enlargement necessary, my first successful effort with it being a panoramic drawing twelve feet long, which I still possess, taken from the roof of the parish church of Lancaster, or the opposite shore of Morecambe Bay, fifteen miles distant, extending from Peel Castle on the southwest to Arnside Knot on the northeast, and including the well-known outline of the Lake Mountains.

"At the Great Exhibition, however, of 1851, I fell in with an instrument specially designed for and adapted to this object, and greatly superior to that which I had hitherto used. This instrument was invented, patented, and made by Varley, the optician, and brother of the well-known water-color artist; he called it the Patent Graphie Telescope. The advantages which this instrument possessed over that which I

had formerly used, consisted chiefly in its portability; in the firm and convenient manner in which it was attached to the drawing-board; in its powers of adjustment; in its diminished telescopic power, not exceeding that of an ordinary opera-glass; and its consequently increased field of vision.

"This instrument has been my constant companion for many years past, and I think I may venture to recommend it to M. Revoil as, in all probability, a considerable improvement on that of which you have given a description, and which appears to me, from that description, to resemble more nearly in its combinations my earlier instrument of 1835.

"I am not aware whether Mr. Varley is still living, nor have I ever met with any one else who knew of or used this instrument; but I quite agree with you in thinking that there are many uses—pictorial, military, and scientific—to which it may be advantageously applied."

To all of which we most cordially assent, as nothing can be more desirable or of greater value to the draughtsman in sketching distant objects, requiring accuracy in architectural detail.

We have ourselves seen something very similar to the foregoing, supposed to be the contrivance of an inventive friend. But, whether it be novel or old, French, English, or American, matters little, if it add a single idea to our present knowledge; or facilitates in any way the progress of art.

THE Pennsylvania Historical Society having become possessed of a library of 15,000 volumes and 85,000 pamphlets and manuscripts, with a large number of portraits and paintings, all illustrative of the history of Pennsylvania and the United States, has appealed to its members for a fund to erect a fire-proof hall where its collections may be made safe and available.

THE WATER QUESTION.

OUR city of Philadelphia has of late been much exercised on the subject of a competent water supply. The Fairmount works, so long admired by strangers, have at last proved a dry subject to all save those whose pecuniary profit it is that they should be so. That there has been either gross incompetency or speculative crime on the part of some person or persons on whom the betaxed public is compelled to depend, is as evident as that the Schuylkill is amply equal to a city water supply under judicious management and scientific foresight.

But, the mischief engendered of wilfulness, if not ignorance, has come upon us, and the leak has already done its work in the city treasury. It yet further remains to be seen this coming winter if the inflated cost of coal shall not be the very natural consequence of a temporary supply of water through a canal which ought to have been the uninterrupted medium of supply of that necessary article of fuel.

HARRISBURG has just taken steps to avoid any such dilemma as this into which our city has been most unexpectedly led, by resolving through its competent commissioners, "that the height of any basin or reservoir shall be two hundred and ten feet at bottom, above the low water mark of 1803 in the Susquehanna river, and that the capacity of the supply to be afforded citizens and manufactories should be six million gallons every twenty-four hours."

Mr. BIRKINBINE, of this city, well known for his able and unfailing superintendence of our Fairmount works in former days, is their chosen engineer, and he has rendered a report to them upon a better supply of water for the city of Harrisburg, which is as interesting as it is practically sound and instructive.

In a comparative table of the value of various waters for domestic purposes, the report alluded to settles a question in which our citizens, or at least a large portion of them, are interested. Some parties have attempted to give currency to the idea that the water of the Delaware river was highly injurious to health, and in fact not potable. The actual analysis of the degrees of hardness will therefore be desirable testimony on so very serious a question as that which concerns the water supply of so large, so populous, and so growing a section of Philadelphia as the northeast. Chemically pure soap is the basis of calculation in the table, which is as follows :

Schuylkill river 6.5

Delaware river.....2.93

Showing the far greater softness of the Delaware river. And the grains of soap required to neutralize salts in one gallon of water are shown in the same table to be :

Schuylkill river.....52.08

Delaware river.....23.45

Now, when the amount of water used in the washing process is taken into account, our housekeepers will at once see what an immense saving there is in the article of soap when the water of the latter river is used instead of the former.

The report says: "A little reflection will demonstrate the great advantage of using soft water. When soap is used the amounts above stated will have to be expended before the material under treatment is in any way affected.

"For making tea, coffee, and other decoctions; cooking vegetables, generating steam, bleaching, dyeing, and many manufacturing processes, soft water possesses value above that which is harder.

"The relative value of different

waters on account of their hardness is difficult to determine, and therefore it has not entered into the estimates in this report.

"From careful estimates made in Glasgow, Scotland, of the saving to the inhabitants of that city, effected by the use of the *soft* water of Loch Katrine, 0.6 degrees of hardness, in place of the *hard* water of the river Clyde, pays the entire interest of the cost of the new works. The experience of this city has been that the demand, for manufactur-

ing purposes, &c., of water of superior *softness* is rapidly absorbing the capacity of its extensive aqueduct."

We may add that as a drinking water rain has long been preferred in many parts of this country to the water of any river, and why? Simply because it has gone through a natural course of distillation which has most effectually deprived it of its salts and rendered it the *soft water* which is economical in all processes in which it is required, as well as healthful and pleasant to drink.

A HOTEL ON ITS TRAVELS.

WE had the pleasure of seeing lately an astonishing specimen of mechanical power and skill in Boston, which rivals the famous house elevating process of the Chicago engineers. Tremont street has to be widened from the corner of the Common out to the beginning of the new avenue. To do this it was necessary either to pull down the Pelham House, a fine new structure at the corner of Tremont and Boylston streets, or to move it bodily, sideways, about twenty feet, towards the Public Library. The house is seventy-five feet wide by one hundred feet deep, five stories high, with a Mansard attic, and a basement story, and is supported on square granite piers, with heavy partition walls of brick. These piers were first clasped with vertically-set timbers, and the whole house then jacked up a few inches from its foundations. Parallel foundation walls about two feet wide were then built in the cellar floor in the direction of the intended movement. Into the top surface of each of these low walls were embedded, side by side, five or six long strips of strap iron. Under each pier or other support of the house were placed about twenty pieces of round rod iron, cut to an equal length of about two and a half feet, and something over an inch thick. Each group of

these short rollers, set crosswise of the strap iron ways, formed a square, upon which the bottom of the pier was allowed to descend and rest. Between all the rollers were interposed square rods of wood to moderate the motion. Of course, as the house moved forward on the ways, the hind rollers and their separating sticks dropped out, and were reinserted in front. The motive force was got by means of sixty or seventy hugh wooden serews, with their heads against the first floor, and their heels against the paving at the curbstone, the intermediate ground having been excavated. The building is said to weigh fifty thousand tons; as it is a hotel arranged in the French mode, giving each occupant a complete apartment or suite of rooms on one floor, and is not only furnished but inhabited by all its boarders during the movement. It began to travel at eight o'clock in the morning of August 21, fourteen of the workmen being detailed to work the serews, and turning together at the sound of a whistle. The rate of movement was about fourteen inches per hour. There seems to be no good reason for doubting that the Pyramid of Cheops, or St. Peter's at Rome, could be moved endwise or sidewise at pleasure, any required distance, by this same process.—*U. S. R. R. Journal.*

STONE QUARRIES OF WESTERN PENNSYLVANIA.

RECENTLY, Messrs. Harrison & Brother, from their quarry at Catfish, Clarion county, delivered a tremendously big stone at the new City Hall building, on Smithfield street. The stone is the largest that has ever been delivered in this city, being in dimensions eight feet wide, sixteen feet long and fifteen inches in thickness, or one hundred and sixty square feet, and weighing about twelve tons. It is intended, with two others of the same size, to cover the balcony of the new City Hall, and will project about six feet from the main wall. The stone in question was loaded on a car on the Alleghany Valley Railroad, from the platform at the siding belonging to the quarrymen, and the weight exceeds that usually allowed for a car some two tons. The next largest stone in the city is that in the sidewalk at the entrance of the Monongahela House, which is twelve by sixteen feet, and ten inches thick.—*Pittsburg Evening Chronicle*.

We ask the architects of Pittsburg and Philadelphia to examine the rock stratum which forms so prominent a feature in the landscape on the west side of the valley of the Loyalhanna, a few miles north of the Pennsylvania Railroad at Latrobe. We have not seen it for a dozen years, but no one who has seen it once can ever forget the impression it produced. It is a plate of sandrock, of coarse texture but great strength, uniform in constitution, regular in fracture, about eighty feet thick without partings, and lying in a vast, vault-like curve over miles of the hill-top country on that side of the Loyalhanna. Its edge is a precipice towards the stream, the lip of a ravine through which the little river winds far below. Its southern outcrop, on the contrary, rests upon an almost level country. Huge masses of the rock, split off from

the stratum, have slid forward, down the gentle slope of three or four degrees, and now stand in the woods, like frigates stranded on a flat, wonderful objects to contemplate. They are cubical in shape, all of the same height, say thirty feet, and some of them a hundred feet in length by fifty wide. It seems a kind of sacrilege to reveal their hiding-place, and induce masons to go in and destroy such rare, fine objects of nature's handiwork. It seems almost as bad as English fancy elephant shooting in Ceylon. But from a business point of view, all we have a right to say is, that stones of any required size can be obtained, not only without the expense of stripping, but from a large number of naturally-constructed open quarry faces; and that there ought to be no great difficulty in placing them upon a siding west of the Latrobe viaduct.

The same stratum of sandrock runs through extensive districts of the bituminous coal field; and there is another exhibition of it, very similar to the one above described, on the highlands of Clearfield county. Others occur along the Maryland line; but none is at present handy to a railroad, like this one at Latrobe. As far as the extraordinary size and wonderful appearance of the blocks may be concerned, the "Stone City" near Olean, on the New York State line excels the natural quarries at Latrobe, but lie in a very inaccessible position, and would furnish a coarser stone, belonging as they do to the Conglomerate Formation at the base of the Coal Measures. It is surprising that tourists have not yet found out the existence of these remarkable objects, surrounded as they are by all the common beauties of a mountain country, and costing little time and trouble to visit. Europe has few things to show more wonderful and pleasing.—*R. R. Journal*.

PUBLIC PARKS.

THE publisher has been kind enough to present us with a very neat and readable pamphlet on the question of "The Public Grounds of Chicago, how to give them Character and Expression. By H. W. S. Cleveland."

Coming from one so intimately connected in his profession with the subject, we do not wonder that its treatment is thorough. As a landscape gardener, the character of Mr. Cleveland is an ample endorsement of his opinions. Critically observant, and independently just, we feel at ease under his monitorship in all æsthetic matters, and cheerfully introduce him to our readers, by citing his observations on

WHAT OTHER CITIES HAVE DONE.

"It is only within a few years," says Mr. Cleveland, "that untravelled Americans have been able to learn, from actual inspection, what is meant by a park. In 1856, the area of the present Central Park of New York was a wild, barren looking tract as could well be imagined, possessed indeed of highly picturesque features in the form of huge ledges of rock, abrupt hills and deep ravines, but no wood, no water, and only occasionally a spot on which the natural soil possessed enough fertility to sustain a growth of grass. From this unpromising material, a garden has been created which comprises a very great variety of beautiful and picturesque scenery, artistically developed to secure the best effects of wood, shrubbery, lawn and water, and adorned with buildings, bridges, and structures of various kinds, whose ornamental architecture serves happily to unite the natural features of the ground with the purely artificial surroundings of the city, which is to encompass them. The engineering work of the Central Park has been done in the most thorough

manner, and the enormous work of grading, draining, and road making, which has been performed, cannot be appreciated even by those who know the difficulties they involve, without a careful examination of the engineer's reports. In the conception and carrying out of the work, New York has passed through the various stages of feeling, which are the inseparable attendants, in every community, of large outlays for public purposes. First, the suggestion of the expediency or necessity of the proposed improvement; then opposition and ridicule, discussion and argument, and finally the commencement and prosecution of the work, with exulting shouts from its advocates, and groaning predictions of ruin from its opponents. The result was looked for with eager interest in other cities just as an individual watches the progress of a new investment of his neighbor or rival as a criterion for himself. And now that the Central Park has proved a success, and New York wonders that she could ever have existed without it, and hundreds of thousands of citizens and strangers are feasting annually upon its charms, and Brooklyn, which, in fact, is only an extension of New York, has followed suit with her Prospect Park, of nearly equal extent, and in some respects superior natural beauty, the other great cities of the land are becoming conscious of their deficiencies, and are beginning to realize that a park must be regarded as a necessity rather than a luxury. In this matter, however, we exhibit the same sheep-like propensity to follow a leader, which is observable in our individual habits of imitation in dress and style of building, which instead of being based upon their adaptation to our wants and peculiar personal features and characteristics, are adopted simply because

they are fashionable. New York has set the fashion in the Central Park, and her sister cities perceive that it becomes her, and so, forsooth, they must adorn themselves in like manner, or try to eclipse her by a more costly decoration.

"New York, being situated upon a long, narrow island, with no access to the country, on either side, except by the disagreeable passage of a ferry, and with the fact in plain sight that the whole island will, in all probability, be covered with streets and houses within half a century, has exhibited a wise foresight in securing such a tract while it was yet in her power to do so, and preserving it forever as a source of comfort, health, and recreation for the people, whose palaces will surround it in future centuries and to whom the landmarks of to-day will be as much objects of curiosity as those of the times of Peter Stuyvesant are to us. It is obvious that its present value to the city is as that of a mere toy, in comparison to what it will then be. Now let us examine the conditions under which some of the other cities are bestirring themselves in the effort to follow her example."

Mr. Cleveland applies himself to the ambitious views (*vistas*?) of our citizens, and his observations are worthy of attention, although we may squirm under the charges of jealousy, rivalry, or vanity. He says of

THE PROPOSED PARK IN PHILADELPHIA.

"Philadelphia, who is always jealous if New York adds a new flounce to her dress, is, of course, the first to endeavor to surpass her in magnificence, and has projected a park, which, if executed according to programme, will indeed be one of the grandest works of the kind in the world, comprising natural features of such beauty and grandeur as art might vainly strive to rival, and whose development and arrangement for use as a park would involve an outlay compared to which the cost of the Central Park would

seem like an economical expenditure. The tract proposed for the purpose lies on both sides of the Schuylkill from Fairmount to the Wissahickon, including a considerable extent of the wild and picturesque valley of the latter stream. The area comprises upwards of two thousand acres, which, instead of being as the Central Park was, a tract of wild and almost unoccupied land, is dotted with villages, factories, villas and farms, of such intrinsic value that the mere purchase of the land would require almost as large an expenditure as has served to construct the Central Park. The advocates of the scheme urge in its favor the fact that real estate has increased in value, in the neighborhood of Central Park, to such an extent that the work has actually proved a good investment, and they argue that the same results would follow in Philadelphia. But they lose sight of the fact that New York must of necessity extend around the Central Park, so that in no distant time it will be in the very heart of the city, whereas Philadelphia can be extended in almost any direction, and is more likely to be so towards the west than up the Schuylkill. The lands in the vicinity of the proposed Park, therefore, will be increased in value only as they are rendered more desirable as sites for villas and rural residences, and can never hope to command such prices as those around the Central Park, every foot of which will be occupied with streets and buildings. The Schuylkill river, flowing through it for a distance of four or five miles, will give to the Philadelphia park a character which is rarely attainable, and an object of great sanitary importance will be secured by preventing for that distance the contamination of the water by noxious sewage. The country on each side comprises such a variety of beautiful and picturesque scenery as would seem to require little artificial aid to increase its attractions, but Philadelphia will not be satisfied with any less elaborate dis-

play than New York, and to carry out the same style of engineering and architectural adornment which have been adopted in the Central Park would involve an expense which is not required by the situation, or justified by any probability of proportionate returns."

Our neighbor, Baltimore, has its pet vanity descanted on in the following terms complimentary :

DRUID HILL PARK.

"Baltimore is rich in the possession of Druid Hill Park—a tract of upwards of five hundred acres, comprising great natural beauty in the form of the ground, and the fine natural growth of the wood with which a large portion of it is covered. It is easily accessible from the city, and its variety of surface affords opportunities which have been tastefully improved for securing pretty vistas and unexpected changes of scene, while following the roads and paths which wind among its hills and valleys, and through the grand old forests, which give them an attractive interest to the citizen who seeks to escape from the artificial surroundings of his daily life, of a higher character than can be attained by the use of ornate structures and elaborate dressing of nature. The true charm of a park should consist in the development of natural features of beauty and interest, as a relief from the purely artificial objects which constitute the city. Architectural ornament is offensive, except as it may be introduced of necessity, as in the case of bridges or buildings of obvious convenience; and the design in all such cases should be in keeping with, and subservient to, the character of the natural features about them, instead of challenging notice by a conspicuous display of form or color. Druid Hill Park is so beautiful naturally, that any unnecessary artificial adornment would be offensive, and as yet, but little has been attempted of such a nature. The immediate wants of the place are the occasional thinning

of the natural growth of wood, and the planting of groups of evergreens and shrubbery on various points of the open ground, where the eye is oppressed by the extent of bare hills and ridges, which seem to implore a covering for their baldness.

"New York, Brooklyn and Baltimore, are thus far the only cities in the United States which boast the actual possession of a park, and half a century at least, must elapse before the Central, Prospect or Druid Hill Parks, will have attained such maturity of aspect, and become so united with the hearts of the people by association, as to have acquired their full capacity of physical beauty, or moral power. Boston, Chicago, Albany, Buffalo, beside a multitude of smaller cities, are agitating the subject, and examining their borders—to see where they can secure the land—and their resources, to see how they can raise the means for the accomplishment of the same object. They perceive that the Central Park, apart from its sanitary and moral influence, is an object of attractive interest to strangers, which is of incalculable pecuniary value to the city, and naturally enough, they desire to follow an example, which, in her case, has proved so successful. Before doing so, however, would it not be well for each of them to institute a careful comparison of her own situation and circumstances with those of New York, and see whether some more appropriate and becoming style of improvement might not be adopted than a mere repetition of such attractive features as she may be able to copy from the Central Park. The mere ambition to be able to boast of a more magnificent display of costly ornaments than one's neighbor, is essentially a vulgar and contemptible sentiment, whether in an individual or a community, and should have no weight in the minds of those who are called upon to decide a question involving so many important interests connected with the future welfare of a city, as the

arrangement of its parks. But every city has a character of its own, resulting from the nature of its situation, and the topography of its surroundings, as well as from its history and growth—and in the creation of its parks, or whatever other description of public grounds may be desirable for its adornment, and the health and recreation of its inhabitants—the aim should always be, if possible, to give them a character of individuality which shall harmonize with that of the city itself, and render them attractive and interesting because it is unique, rather than because its features are more or less magnificent than those which may be found elsewhere.”

We entirely agree with Mr. Cleveland in his remarks on a Boston Park. They are words of common sense, and have an intrinsic value to those who are not quite carried away with the gassy exhalations of a newly found spring of fashion.

“Surely,” says Mr. Cleveland, “it can need no argument beyond the mere statement of the case, to prove that each of these cities requires its own style of adornment, in keeping with its moral and physical character, and while each may secure to itself attractions which are perhaps equal in interest, they must of necessity be so different in their nature, that no feeling of rivalry should exist, and scarcely could a comparison be drawn between them.”

He then takes hold of the “Hub” with the text :

WHAT BOSTON MAY DO.

“To begin with Boston, it will not be difficult to demonstrate, first, that she has neither the necessity or the power to create a park such as New York has secured, without going so far beyond her limits as to render it comparatively of little value, and, second, that she may acquire at a comparatively small expense, all the essential advantages she could derive from a park, by the

adoption of a system of improvements which would be original and unique, since no other of our large cities possesses the means for its accomplishment which in her case, are already in existence.

“The peninsula occupied by the city being exposed to the sea-breezes on three sides, and having an open space of seventy-five acres, comprising the Common and Public Garden on the land side, is in no need of further provision for ventilation, except by the process of widening the streets of the older parts of the city, the necessity for which is gradually enforcing its accomplishment. When the new made land of the Back Bay is covered with buildings, it is true that a broad area of bricks and mortar will exist, unbroken except by the streets, and it has been suggested that a portion of this territory should be reserved for a park. For sanitary purposes this is unnecessary, as the breadth of the streets and avenues will be such as to secure abundant ventilation, and the situation is such that it would be impossible to attain the most desirable characteristics of a park.

“If Boston attempts a park comprising any attractions of natural scenery, she must go beyond her own limits, or at least, into her lately annexed territory of Roxbury. The tract which possesses in itself the most desirable features for a park of any in the vicinity of Boston, and such as are very rarely attainable anywhere, is the region round about Spot Pond in Malden, Medford, and Stoneham. The lake itself covers three hundred acres, and the country around it is wildly picturesque in its character, and is to a great extent unimproved and in its primitive condition, and much of it is heavily wooded. The surface is broken by abrupt hills, and deep ravines, whose precipitous sides are sometimes bare, and sometimes covered with a growth of picturesque trees and shrubbery, and at different points are opened superb

views of the city, the harbor and the surrounding country. And this tract may be reached by the cars in twenty minutes, though probably more than half the inhabitants of Boston are ignorant of its existence. But it is not readily available as a park for Boston, because it can only be reached by a disagreeable ride across Charlestown Neck, and the marshes bordering Mystic river. In no other direction, within any reasonable distance of Boston, is it possible to find a tract of sufficient extent for a park, which is not already occupied in such a way as to give it great intrinsic value, apart from the speculative margin which is sure to be put upon it when wanted for such a purpose. Unless, therefore, the city is prepared to assume the enormous debt which she must incur in purchasing these improved lands, she must go so far beyond her borders as to detract, in a very great degree, from the value of the possession.

"If, now, a citizen of New York, Philadelphia, Baltimore, or any southern or western city, who had never been in Boston, were taken out by a Bostonian to examine the surrounding country, with a view to getting his opinion as to the best position for a park, he would not ride a mile out of the city on any road, without expressions of admiration of the beauty of the natural features, and the taste which has been shown in their development, not only in the grounds pertaining to the rich villas, but in the simple and homelike character of the smaller areas, connected with pretty cottages, and the thrifty and neat appearance of even the humblest abodes; and when, on riding for miles and miles in any and every direction, he found, everywhere the same evidence of taste and culture, with an ever-changing variety of natural scenery, of hill and dale, wood and lawn, ocean, river and brook, such as can be found in the vicinity of no other city on this continent, he might justly ask, (and the question is not an imaginary one,)

'What do you Bostonians want of a park, with such wealth of natural beauty all around you, and almost every foot of it so tastefully improved by private hand?'

"Perhaps the question may suggest the further reflection that the most costly portion of the work of a park is already done, and the scenes of beauty and attractive interest which meet the eye are quite as much the property of any one who can enjoy them, as are those of the Central Park, where his steps are as strictly confined to the roads and paths as if the adjoining fields were private grounds. Here, then, we have an area, compared to which the Central Park is of trifling extent, the natural beauty of which has been so far improved by private hands, that one may ride for days in succession through continually varying scenes in which the display of individual taste, and the character of refinement and home comfort which is everywhere apparent, excite an interest of a more durable nature than can pertain to a tract in which nature has been elaborately dressed for the sole and avowed object of display. It remains only for Boston to avail herself of the opportunity thus offered by finishing and adorning the roads which wind among these charming scenes in a corresponding style, and she may thus appropriate their beauty, and instead of adorning herself with a single costly bouquet, she may clothe herself with a garment of flowers which has been woven for her by the hands of her children. The expenditure of a comparatively small sum, in the manner above suggested, would make a park of the whole surrounding country, which would exert a higher and wider moral influence than could possibly be attained by the appropriation of any single tract to the purpose. The labor and consequent cost could also be divided through a series of years and shared with the towns within whose limits the improvements were made,

though in order to preserve unity of design their general direction should be governed by one head. The work should begin by choosing a certain section whose limits should be governed by the means at command for its improvement, and the special requirements of the situation. Of these, the first to be considered should be its thorough drainage; then the construction of the roads, and finally the tasteful arrangement of the roadsides. The drainage and road-making would, of course, be entrusted to a competent engineer; but the adornment of the roadsides should be designed and directed by an artist of the best attainable class. The danger to be apprehended, which will present itself to the mind of every man of taste who considers the subject, will be that of too elaborate a display of decorative art, which in many places would be glaringly offensive from its incongruity with the prevailing character of the adjoining grounds. The general tone should be that of simplicity, and the effort should be only to develop natural beauty by the use of natural means. In places where the villa residences were in close proximity with each other and the grounds carefully dressed, the roadsides should be finished correspondingly; yet even in such cases opportunities might offer for the exercise of taste in the planting of trees, by studying the form of the adjacent grounds, or the natural growth already existing and taking therefrom the key note for the further carrying out of nature's suggestion, instead of planting a formal row of a single variety of trees on each side. In the more secluded and least populous neighborhoods, nature might be more closely copied in the planting as well as shaping the grounds, and frequent opportunities might be secured for creating scenes of attractive rural beauty, or of picturesque effect, by simple means which would readily suggest themselves to a skilful artist. Tracts of land, of greater or less extent, which

possessed no special value as building sites, might occasionally be purchased at comparatively low prices, and indeed it is not improbable that owners of real estate might contribute portions of their land for purposes of public improvement even if actuated by no higher motive than self-interest. Such tracts might be improved as gardens or small parks, and rendered attractive by the aid of natural or artificial objects of interest, or by appropriating them to a special purpose, as a cricket ground, a place for target practice, or a race course for velocipedes; though if these suggestions are carried out, the lovers of the last named exercise may run their machines on any road in the vicinity of the city.

"The question will probably arise in the mind of every thoughtful man, whether the people at large can be trusted with the preservation of so widely extended a territory, adorned in the style suggested; whether so large a police force would not be required to prevent depredations and vandalisms as virtually to render it impracticable. To this the reply is, that good taste would prevent the introduction of any kind of ornamentation on the roads which would seem to invite the spirit of rowdiness to active exercise. The highways should simply be rendered attractive by the tasteful introduction of objects of natural beauty and interest, and no artificial structures should be admitted for merely ornamental purposes, but only for those of obvious utility. These would consist of bridges, for crossing streams, railroads or ravines, fountains or watering places for the refreshment of man or beast, and seats or resting places for pedestrians. All these might be made to contribute to the general effect by being of graceful and attractive architectural design, and they should be of such form and material as would preserve them from liability to injury or decay.

"Enough has been said to convey the general idea that Boston has it in her

power, by merely developing the attractions which nature and art have already furnished, to secure for herself such a character of artistic beauty as no other city on the continent could compete with. Any one who has been familiar with the progress of the city and its surroundings, for the last thirty years, will perceive on comparing her present and past conditions that the growth of civilization and refinement throughout the whole period has been marked quite as distinctly by improvement in taste and artistic culture, as by devices for promoting physical comfort and convenience, and the next and most obvious step in the onward course is the one here indicated. It is one which is justly due to the thousands of suburban residents, who have done so much towards rendering the city attractive by clothing the surrounding hills and fields with beauty, and an obvious effect of the measure will be to animate every one whose estate is approached or bounded by such an avenue, to adorn and preserve his own grounds in corresponding style, and thus the work would be everywhere exerting a silent but most effective influence in elevating and directing the taste and knowledge of the people at large. I submit the plan to the consideration of the citizens of Boston, and respectively ask them to put to themselves the question: Is it not the most simple and practical scheme that can be devised for providing all that is most desirable in a park? Is it not the one most naturally and obviously resulting from the advantages already secured and which even now give to Boston a peculiar character, of which this will be the ultimate development and crowning charm? And, finally, is it not time to set about the work?"

Lastly, but far from leastly, Mr. Cleveland turns to Chicago and tells the Empire City of the West her fortune in these well considered observations.

WHAT CHICAGO MAY DO.

"What Boston finds it impossible to accomplish in the third century of her existence, Chicago is preparing to do in her third decade. With a wise forethought she has secured and appropriated lands for her parks while they are still unoccupied; for the most part even by a tree or a shrub, a hill or a stone. The city and the country around it, with the exception of a narrow strip on the lake shore, is a dead level extending in every direction almost as far as the eye can reach. Along the shore of the lake are slight elevations of sandy soil, which, in contrast with the perfectly flat surface which prevails everywhere else, may be called hills, and these are, to some extent, clothed with a growth of young oaks. The shore is a sandy beach, without a bay or a projecting headland, and the view from it is simply across the waters to the horizon, unbroken even by an island or a rock. Areas, of several hundred acres each, have been reserved for parks on the north, west and south of the city, and these are to be connected by a grand avenue, or 'boulevard,' three hundred feet in width and fourteen miles long. With the exception of the portions which lie upon the lake shore, all of these parks, and the whole length of the boulevard, are necessarily located upon the flat surface which surrounds the city, and the problem to be solved is, by what arrangement they can be rendered attractive and interesting as places of recreation and refreshment to the citizens. No one who has made himself acquainted with the past history of the city, and the resources of the vast country of which Chicago is the natural outlet, can have any doubt that before many years, the area which has been thus reserved will be enclosed within thickly peopled streets and avenues, and the question, by what means is it possible to give to areas so utterly devoid of character,

an expression of natural beauty, and secure enough variety to relieve their monotony? is one which must present itself to every one, and is certainly not an easy one to answer. But nothing is to be gained by shirking the fact, and trusting that the ordinary devices of the landscape gardener will suffice for so extraordinary an occasion. The ordinary means of relief which are available here, consists of alterations of the shape of the ground, the introduction of water in the forms of lakes, streams and fountains, and the use of trees, shrubs and flowers in plantations. But everything must be created. Nature has not even offered a suggestion for art to develop. The labor of making alterations of the surface of the ground is so enormous that man's utmost efforts are paltry and insignificant in comparison with the works of nature, and it is very rare that anything like a natural expression can be given to an artificial hill. Still it must be resorted to more or less, and on the parks, if skilfully managed, and confined to simple and graceful forms, without attempting the picturesque or the sublime, which would certainly result in the ridiculous; much may be thus effected, especially in contrast with water, and with a tasteful arrangement of trees and shrubbery. In fact the management of the parks will be comparatively easy, the great danger being that in inefficient hands the effort at decoration may lapse into the use of mere puerilities and trickeries. But the effort, under such difficulties as the case involves, to give variety and interest to the Boulevard, is one which is truly appalling. Very little variation of the surface can here be resorted to without becoming simply ridiculous, from the narrow limits to which it must be confined. Three hundred feet it is true, is a grand breadth for an avenue, but a very narrow space on which to operate in creating variety of natural scenery for a distance of fourteen miles, without a single natural elevation or

depression by the wayside for the whole distance, to sustain the appearance of any inequality which might be artificially introduced. The drive way, extending throughout its whole length, should be not less than sixty feet wide. To carry it straight from end to end would be fearfully formal and dreary, yet to make a turn in a road, without any obvious necessity or object, is a violation not only of the rules of landscape gardening, but of common sense.

"In considering the means of overcoming this difficulty, by resort to other sources of interest than those which are ordinarily employed, the fact must never be lost sight of, that the primary object of a park is to minister to the health and recreation of the citizens; to provide a place for the indulgence of such rational pleasures and amusements, public gatherings and displays, as are inadmissible in the ordinary thoroughfares of the city, and the first duty of those who have the work in charge, is to make such arrangement of the natural and artificial objects of attraction, and such a disposition of the roads, walks, and open spaces, as may best serve that end; and nothing should be admitted as a permanent feature, which conflicts, or tends to the disturbance of the sense of rest and refreshment. Thus we should exclude from its precincts, museums and collections of works of art, because by their presence they invite examination and study, which cannot be indulged without exertion and fatigue. Even zoological collections, for the same reason, should be excluded from the actual precincts of a park, though they, as well as museums of art, and natural science, may be very properly located in its immediate neighborhood. In so far, however, as objects of natural interest, or artistic skill may be made to conduce to the general effect, and add to the beauty of the place, they are not only admissible but exceedingly desirable. Statues, vases, and ornamental

structures of various kinds, may render most important service, and animals, whose nature and habits admit of their being left at liberty on the grounds, may contribute very greatly to the beauty and attractive interest of the scene. Perhaps a majority of those who seek relief and relaxation from the fatigue and care of daily toil, will be satisfied with the mere enjoyment of scenes of natural beauty; with rambling or resting under the trees, looking upon verdant lawns, and inhaling the perfume of flowers. The escape from the din and turmoil of the streets, is to the multitude whose lives are passed in the city, a source of inexpressible enjoyment; and the object of a park being to afford such relaxation, we should seek so far as possible, to rely for the purpose upon the resources which nature herself has furnished. In the present case, nature has denied us many of the features which have been commonly considered indispensable to the full development of her charms, and art can only supply their want to a limited extent. The question then arises, is it not possible to devise such an arrangement of the objects of natural interest which we *can* control, as to develop effects which have no where else been attempted, and render them so intrinsically attractive, that the want of those which we cannot command will not be felt.

"I think the question may safely be answered in the affirmative, and I proceed to the consideration of some of the means by which it would seem that the end may be attained, though in its development in construction, no doubt very many features would suggest themselves to the mind, which had not previously been thought of.

"The landscape gardener is accustomed, in arranging his plantations, to rely for effect on the adaptation of the different varieties of trees and shrubs to the situation and its surroundings, and on the mingling of such varieties as will

produce a harmonious blending of form and color. Thus, on a broken and picturesque tract, his plantations are wild and irregular in form—the groups running into each other confusedly, and the individual evergreen, or deciduous trees, selected from such varieties as are, by their nature, of striking character, or liable to assume quaint and peculiar forms. On gently undulating ground, he makes use of such trees as are naturally graceful and symmetrical, such as the tulip tree, the elm, the ash, or the maple. On low ground, and in the vicinity of water, he makes use of the weeping elm, willow, and birch—the object in each case being the further development of the effect, of which nature has given the key-note. No attention, whatever, is paid to the arrangement of trees according to botanical order, the only object being to secure the desired expression. In fact, it is rarely that the landscape gardener makes use, to any great extent, of a single family of trees, to the exclusion of all others, and there is certainly a strong temptation when directing such work, to mingle varieties, with the idea of thus creating variety. Yet it has often a very contrary effect, and a much more striking expression may be secured by massing those of the same kind together. I do not of course mean that in the arrangement of plantations on any given area, I would have one group to consist entirely of oaks, another of maples, and a third of elms, and so on; though even in that method a more decided character could be conferred, than by having each group made up of specimens of every variety—which simply fritters away all effect and leaves a confused impression on the mind.

"The botanist, on the other hand, disdains the arts of the landscape gardener, and in arranging an arboretum, aims only to secure specimens of as many varieties of trees as possible, and plants them so that each individual may

have the most favorable opportunity to exhibit its peculiar characteristics—no regard, whatever, being paid to general effect, or its harmonious blending with its neighbors.

“Now, I am confident that the two arts—or, perhaps I should say, the art and science—may be brought into close communion with each other with perfect harmony, and with satisfactory results; and on this union I base the principle on which I propose that the plantations of the Boulevard shall be made. Let the avenue form in its whole extent, an arboretum, comprising every variety of tree and shrub which will thrive in this climate, each family occupying a distinct section, of greater or less extent, according to its importance, in which all the skill of the gardener’s art may be displayed, but in which all the artistic effect shall be produced by the use of varieties of the single family to which the portion is appropriated.

“The objection to this plan will at once arise in most minds, that it will be impossible by means of it, to avoid a formal character, or give any essential variety of expression, and in fact, would serve only to increase the monotony. If this were true, or if the tendency of the arrangement should be to convey the idea of a scientific collection, it would be a sufficient reason for its abandonment. No such necessity, however, exists, and a consideration of some of the facts of the case, will suffice to dissipate the apprehension. Bearing in mind what has recently been said in regard to massing together trees of the same kind, instead of mingling different kinds indiscriminately, a little reflection will show, that in driving through such an avenue as the proposed Boulevard, a much more effective sense of variety could be secured by the former, than the latter plan. Suppose, for instance, that a visitor enters the avenue at a point at which the plantations consist entirely of maple; there are up-

wards of thirty varieties of this tree, and their arrangement should be such as to exhibit their capacity for effect in various ways—as, in rows for lining a straight avenue, for which the sugar and white maples are peculiarly fitted by their size and symmetry: as single trees, or in groups upon a lawn—in which groups, by the way, it would be consistent with the plan to introduce occasional specimens of other trees, in order to show what kinds would combine effectively with the maple in form and color—and, indeed, many of the less important trees, or such as are deficient in variety might be introduced *only* in such ways, as pendants to more distinguished families. Vines and shrubs might, of course, be used as freely as need be, and it would be easy with their aid to create with all the different maples, such varied effects as would prevent the interest from flagging for a very considerable extent of the tract. Proceeding onward, the attention of the visitor is suddenly aroused to the fact that the whole character of the scene is changed: he is traversing a grove of oaks, and although he may have time and again seen oak and maple trees growing together in the woods, without a thought of their difference, he cannot fail to be struck by the different effect of the two when thus contrasted in masses. There are one hundred and fifty species of oaks, of which the great majority may be grown in this climate. They vary in height from five or six, to eighty or ninety feet, and their foliage assumes a wonderful variety of forms; from the broad, glossy, arabesque leaf of the Black Jack, to the narrow, pointed leaf of the Willow Oak, which can hardly be distinguished from that of the tree from which it takes its name.

“Surely the landscape gardener need be at no loss for materials to produce effects, with such variety of form, color and foliage at his command, and no one can fail to perceive that the attractive

interest of each section, would be very much greater, and that of the whole better sustained, by such a system of concentration. For each division would have, if properly managed, so distinct and attractive a character of its own, as to excite a pleasing emotion by the mere sense of change; whereas, in the ordinary methods of planting, however tasteful in execution, the result could be only a series of pleasing scenes, which must ere long become tiresome from their very sameness and want of distinctive character. I have named but two kinds of trees, as illustrations of my meaning. If the reader will now call to mind the varieties of trees in common use for ornamental purposes, such as the Elm, Ash, Beech, Birch, Tulip, Chestnut, Walnut, &c., and then those of inferior size, as the Hornbeam, Dog-wood, and Judas Tree, to say nothing of the more rare varieties which may be introduced, and the multitudes of beautiful shrubs and vines which may be skilfully used in conjunction with them, he will, I think, acknowledge the possibility of creating with them an almost endless variety. And when, in addition to the deciduous trees, he opens the list of evergreens, and tries to imagine the effects which may be produced by the use of the different Pines, Firs, Spruces, Cedars, Junipers, &c., his apprehensions will perhaps be excited lest the area should be insufficient for their display.

"At all events, is it not evident that by these means the sense of monotony would be entirely relieved, and so varied a character given to the different portions of the tract that each would possess an attractive power of its own, and form an objective point for deciding the course of a drive, which otherwise would be entered upon with a feeling of indifference as to locality? With the realization of this idea, Chicago would be in possession of a public promenade, perfectly unique in its character, and of an arboretum in which the varieties of

trees, instead of appearing as individual specimens, would be represented in such numbers as to display their characteristics in all the situations in which they appear in nature, or to which they may be appropriately adapted by art. Such an arboretum does not exist in the world, and it is surely unnecessary to enlarge upon the value and interest of such a collection to the people of the West, or to the countless throngs who will make Chicago a resting place on their journey thither.

"I trust that the comparison I have drawn between the two cities may have proved the point with which I started, that every city should adapt the style of arrangement of her public grounds to the peculiar characteristics of her condition and topographical features. Chicago could by no possibility adopt the design I have proposed for Boston; it would be absurd for Boston to attempt the one I have suggested for Chicago; and for either to attempt to vie with the Central Park, by simply imitating its style of arrangement, would result in nothing satisfactory, because in nothing characteristic. Whereas, each may, by the means suggested, secure to herself a source of attractive interest, entirely consonant with good taste, and full of the racy flavor of individuality, a quality which we, as a people, should omit no opportunity to secure, since the tendency in everything is towards the dreary uniformity of machine work.

"I have made no special allusion to the parks of Chicago, as distinguished from the boulevard, and, indeed, I have rather endeavored, in the illustration I have given, to convey my idea of what should be the governing principle, than to enter into any details of execution. That principle may be said to consist in making such skilful and artistic use of naturally attractive objects, as to give an intrinsic interest to every portion of the area, which would absorb the attention, and prevent the mind from dwell-

ing upon its deficiencies. The principle is equally applicable to the parks, and it is susceptible of almost endless variety in the elaboration of its details. The parks have the same difficulties to overcome in their construction which have already been described, and which cannot be met by the ordinary resources. On the other hand, they are to form conspicuous ornaments of a city whose magnificence will result from the fact that she is to be the eastern portal of a region whose wealth and power cannot be measured by anything the world has yet seen. In the exhibition of all that may serve to illustrate that power, Chicago may find the appropriate materials for her adornment, and in the admiration and interest which they will excite, the trifling deficiencies of the immediate locality will be forgotten."

There is not a young city of promise in this wide land that will not derive advantage from the teachings of this man of experienced taste and natural sense; and therefore are we pleased to see his little treatise in a second edition. It should be stereotyped for the future use of generations yet to come of trustees of public grounds.

LEOCADIA MARBLE.

THIS great State of Pennsylvania is rich in mineral wealth, the development of which is a frequent occurrence, and our State Geologists have in their surveys reported the discovery of "a substance, among the limestone regions," to use their own words, "somewhat resembling Brescia, or conglomerate marble, mainly of the redstone formation. Very brilliant, and of every conceivable variety of color, and would no doubt, if worked, be very advantageously employed for building purposes; as it has all the consistency of the best foreign marbles, and is susceptible of receiving a high degree of polish."

An extensive quarry of the above described marble has, within the last few months, been fully explored and thoroughly examined. It is situated in Lancaster county, in this State, and is very convenient to the Pennsylvania Railroad.

For the efficient working it, a company has been formed, and it is fully expected that during the coming year, a supply will be quarried equal to all reasonable demands.

The marble in question, is not absolutely Brescia; neither is it positive conglomerate, but partakes of both characters. Being thus equally one as another, it is unlike any other known specimen, and is therefore called LEOCADIA.

As an ornamental material, it must take a high position; and as it can be furnished reasonably and readily, in required quantities, there is little doubt but it will soon supersede the foreign imported article of marble in this country.

The Leocadia Marble Company has its head office at 54 Wall street, New York, where the President, JAMES W. HALE, Esq., can be addressed by those desirous of further information.

A dispatch from Buffalo, dated the 12th of September, says:

The chime of bells manufactured in France for St. Joseph's Cathedral in this city, having been mounted in the tower of the edifice, large crowds of citizens of all denominations assembled at the Cathedral, and filled the neighboring streets to listen to the first performance of the bells, forty-three in number. They are worked by a key-board, and discourse beautiful music. Attached to the chimes, and independent of the keyboard, is a clock which is made to play any required tune on the bells by means of one hundred and twenty-three hammers, arranged on the outside of the bells.

EUROPEAN NOTES.

AMSTERDAM.—The visitor will find much to interest him in the quaint streets of Amsterdam. The marvel of the whole city is the simple fact that houses should ever have been built at all, considering that there is literally no foundation, and that for the upper ten or fifteen feet of the surface there is nothing but loose bog, sand, and clay. Every house is built upon piles of great length, so that Erasmus, writing from Amsterdam, said that he had reached a city whose inhabitants, like crows, lived on the tops of trees. The Palace or Stad-daus (equivalent to our city halls) is built upon 13,659 piles, driven 70 feet into the ground; and we can scarcely marvel when we see the enormous mass of building that they have to support. We were informed by the manager of the gas-works that even the gas-pipes not uncommonly sink a couple of feet or so in the treacherous soil, and the engineer of the new dam at the entrance of the Zuyder Zee, which forms the commencement of the North Sea Canal, has seen his bags of sand disappear six or eight feet at a single blow of the pile driving machine. The amount of stagnant water that we saw between the piles of an old house in course of demolition horrified us; but it can scarcely be wondered at when we know that Amsterdam is built on ninety islands, to which the communication is kept up by two hundred and fifty bridges. Drainage there is none; cesspools, which frequently have to be emptied out through the houses, being in common use. Indeed, if gaspipes disappear so, it is difficult to understand how drainage pipes could ever be induced to remain, let alone the difficulty of crossing the canals, which are all used for navigation, and yet could not be crossed below their bed. Of course the smells are very grievous, but these arise from

the stagnation of the water, the gas from which bubbles up to an extent that makes one think it is raining. The streets themselves, which are all paved with stone from Belgium and the Rhine, are, generally speaking, clean, the gutters being frequently formed of long wooden boxes with a hinged cover; so that at all events, whatever may be the state of the current inside, the pedestrian is not annoyed by the constant sight or smell of slops.

THE SMALLER ISLANDS OF JAPAN.—Many of these islands are merely masses of black or brown rocks of volcanic origin, and present the appearance of a sugarloaf or some fantastic form; others are hills of sand, whose undulations remind one of the dunes of Holland. On some of the islands—which, although uninhabited, are cultivated by the neighboring villagers—we saw large fields of rice and corn, and hills and valleys covered with luxurious vegetation. But in the midst of this wealth of nature, the agricultural population of Japan lives in a state bordering on want; the produce of their labor belongs to the Daimois, or lords of the soil. Owing to the absence of a middle class, the Japanese villages have a wretched appearance. A free civilization would have covered the banks of the inland sea with picturesque villages and elegant villas; as it is, the only important objects are the temples, and these, at a little distance, can only be distinguished by the venerable trees which surround them. The manorial castles are usually at some distance from the towns and villages, and consist of a spacious quadrangular enclosure of high and massive walls, surmounted by a moat, and flanked at the angles, or surmounted at intervals all round by square turrets, with slightly-sloping roofs. Within are

the park, the gardens, and the residence of the noblemen, comprising a principal building and numerous offices. Sometimes a separate tower, of the same form as the other buildings, rises several stories higher than the level of the outer wall, each story being surmounted by a projecting roof in the style of the Chinese pagodas, but generally without an accompanying gallery. All the masonry is rough, and joined by cement; the woodwork is painted red and black, and enriched with copper ornaments; while the *pise* (brickwork) is white-washed, and the tiles on the roofings are slate-colored. In these edifices the details are less considered than the general effect produced by their height and harmonious proportions; and from this point of view, some of the manorial residences of Japan are worthy to rank amongst the most remarkable monuments of Oriental architecture.

AN atrocious act of vandalism was perpetrated a few nights since by throwing a sponge saturated with ink upon the elegant Terpsichorean group of statuery, in white marble, in front of the new Opera House. From the porous nature of the stone it is feared that one of the principal figures is nearly ruined. Much sympathy is expressed for M. Carpeaux, the sculptor, and the next day crowns of laurel were found placed upon the statues.—*Paris Paper.*

THE Industrial Exhibition at Leipsic has been carried on with great spirit. Its chief object was to challenge competition in objects of substantial value. With regard to the structure, all was arranged in the most artistic fashion, and the building was of ample dimensions. The Palace was crowded with visitors from the first, and the Exhibition was popular in consequence of the moderate rate of charges. One circumstance worthy of notice in the Leipsic Exhibition was that few individuals figured in more than one department in

the list of exhibitors. The Leipsicers have complained that they had not much time to prepare, and that sufficient support was not given to them. But, on the whole, the affair has been most creditable. The Exhibition kept steadily to its purpose.

IN a sketch of Garibaldi's home on the island of Caprera, the writer might put to his reader the question which Claude addressed to Pauline—"Say, dost thou like the picture?"—"Luxuriant groves of laurel and myrtle have sprung up to overshadow his lowly roof. All round, in the hollows, wherever shelter could be found or made, the orange or lemon are growing in thickets, while on more exposed sites there spreads a wide plantation of olive and almond, overtopped by the cypress, the pine, and even the date palm, though the latter bears no fruit." Then we are informed that though "Garibaldi himself drinks no wine, he is a wine-grower on a large scale. The Marsala and Malaga grapes, growing at will on his lofty arbors, supply luscious fruit. The prickly pear and the carob tree are so prolific that their produce is thrown with a full hand to fatten swine. The dairy is supplied with milk and butter by six cows of the tall Cremona breed, whilst numerous herds of cattle roam at large in the island, needing no shelter at any time of the year, and providing the establishment with mountain-fed butcher's meat, in return for the lucerne and clover which the general coaxes out of artificial meadows where the grass is cut five times in the year." His potatoes are superabundant. He has been successful also in the cultivation of bees. We think the Italians would do well to emulate their great hero in these quiet pursuits of his little island home.

THE *Indépendance Belge* mentions that Brussels has rarely been so full of visitors as it is just now. Travellers from every country are making the city a halting-place in the midst of their ex-

cursions. On the 22d and 23d ults., the number was so large that in one of the principal hotels of the capital, the new arrivals—all the apartments being occupied—had to make shift in the dining-rooms, the passages, and even in the courtyard, until vacancies occurred. As a natural consequence of the influx of visitors, the streets presented a very animated appearance, and although it is the season when nobody is supposed to be in Brussels, there are crowds of people everywhere, even at the theatres, notwithstanding that the weather is more favorable to outdoor than to indoor amusements.

THE broad street which is being opened from the new Opera to the Théâtre Française and Louvre, will soon sweep over the house where Corneille died. A slab of black marble on the façade attests that the author of the noblest works in French tragedy died there in 1684. A low gateway leads into a courtyard, where a bust of the poet, crowned with laurels, stands in a niche, around which creeping plants fall in festoons. Below is an inscription to the effect that the house belonged to Pierre Corneille, and above are the words *Le Cid*. Another old house, which has also its history, is now being restored. In it the first restaurant was opened more than a hundred years ago. *Restaurants* seem so natural to the soil of Paris, that it is difficult to believe that they date but a century back. The name did not apply then to the establishment itself, but to a particular delicacy sold there. A soup called *restaurant divin*, compounded of poultry and butcher's meat, barley, dried roses, and Smyrna raisins, was in high favor just then in luxurious circles, when a celebrated doctor discovered a much simpler way of making as divine a soup, and a man named Boulanger opened a little shop in the Rue des Poulies for the sale of the new *restaurant*, and the place soon became the rage.—*Continental Gazette*.

THE project of cutting a canal through the Isthmus of Corinth, which was conceived some years back, but could not be realized for want of funds, has been revived. The canal would only be rather more than three miles long, and would not cost more than from £450,000 to £500,000. It would shorten the distance from Marseilles to Constantinople by fourteen hours, and from Trieste to the same city by twenty hours.—*Ib*.

THE foundation stone of a new and magnificent Jewish Synagogue, at St. Petersburg, has been laid. The building will cost 250,000 roubles, (£40,000.)

A MONSTER GAS-WORK.—Barking, on the Thames, already celebrated by its "northern outfall" and its patent sewage factory, is to become still more famous by the presence of the largest gas-work in the world. As we mentioned some months ago, the Chartered Gas-works are about to remove from their present position, in the heart of the metropolis, to Barking. The new works are on a scale of extraordinary magnitude. They cover 150 acres of ground. The four retort houses are each 360 feet in length. There will be 1,080 retorts, capable of containing 1,000 tons of coal daily, and of producing 10,000,000 cubic feet of gas. There will be four gas-holders, each capable of holding 1,000,000 cubic feet. There will be $11\frac{1}{2}$ miles of main from Barking to Westminster, and $8\frac{1}{4}$ miles of this length the main will be no less than four feet in diameter.

THE discovery has just been made in the valley of the Aisne, not far from Compiègne, of several ancient places of sepulture, of specimens of pottery, a bronze collar, etc. More than thirty bodies were found, with two vases placed near each; these latter, by their form, composition, and contour, remind one of the pre-historic earthenware found in Druidical remains. With the exception of

one, all were broken. Further researches would seem to indicate that this cemetery extends to some distance; and after the harvest is got in, other explorations will take place. Thirty years ago, discoveries of a similar character were made at the other extremity of the town. An ancient Gallic causeway, the vestiges of which are still apparent, seems to have united the two.

SEVERAL persons are now employed at the Louvre in placing numbers in all the rooms of the twenty-five museums, and in forming a complete catalogue of the works of art and curiosities, amounting to more than 200,000. The fifty-six columns and pilasters forming the celebrated colonnade having been deteriorated by the rigors of two hundred winters, a plan has been devised for completely restoring them. The paintings purchased or acquired during the last year are the following: "Virgin and Child," attributed to Memling; "Head of St. John," by Andrea Solari, presented by M. Eugène Lecomte; "The Deposition in the Tomb," by Ribeira, a first-rate work; "Sainte Apolline," by Zurbaran; a Landscape, said to be by Paul Potter, which cost 18,000 fr.; "Portrait of Mme. Naudebourn-Lescot," given by Mme. Bunher, a picture which Poussin could not finish before his death; three small paintings, by Chardin; a portrait of Denon, by Prudhon; a pastel of a Child, by John Russel, presented by Mr. Vikery.—*Continental Gazette*.

"THE new apparatus at Marly, now that it is regularly at work," says the *Journal Officiel*, "completely fulfils the expectations formed of it; and at present, Versailles, Saint-Cloud, and the neighboring localities, receive in abundance the water of which they were formerly deficient. This machine, which daily attracts numerous visitors, consists of six water-wheels of twelve metres (about 40 ft.) diameter, each of them driving four pumps, which force the

liquid up to the aqueduct, a height of 160 metres. Workmen are finishing at this moment the decorative sculptures of the vast building in stone and brick which contains this curious mechanism, so much more powerful than that constructed in the reign of Louis XIV., by Deville and Rennequin."

ON the 109th anniversary, last week, of the battle of Liegnitz, in Lower Silesia, that event was celebrated in that old town by the unveiling of a bronze statue of the hero of the fight, Frederick the Great. The cost, which, including the pedestal and three granite steps, amounted to 4,020 thalers, has been entirely covered by the voluntary subscription of the inhabitants.

THE Berlin journals state that Professor Blaser's colossal bust of Humboldt has been successfully cast in bronze by Howaldt, and the finished work gives the artist the greatest satisfaction. As the time is too short to allow its being exhibited in Berlin, it has been forwarded at once from Brunswick to New York.

A BEAUTIFUL SPECIMEN OF MARBLE.—The Commissioner of the General Land Office has just received from the Surveyor General's Office at Leavenworth a beautiful specimen of the marble recently discovered by the Leavenworth Coal Company in shafting for coal on their track at the southeast corner of the Fort Leavenworth Reservation. The bed from which this specimen was taken lies at a depth of 300 feet from the surface, and the stratum is over twelve feet in thickness. This marble is a *dolomitic silicate* of magnesia, a composition more durable than Italian marble. The specimen received is polished on one side, showing small crystals of pearl spar, while some of the markings have the appearance of light clouds.—*U. S. R. R. Register*.

CORRESPONDENCE.

It must be distinctly understood that we do not hold ourselves accountable for the opinions of correspondents

EDITOR OF THE ARCHITECTURAL REVIEW.

DEAR SIR:—Your correspondent, R. V. T., in quoting from my paper on "Fire-proof Construction," left out a few words, which make my deductions as to the comparative expense of iron, lath, and plaster, and marble finish, seem ridiculous. The sentence as given in his paper reads, "Iron lath, of the form generally used, costs nine cents per foot." Supplying the words omitted it should read, "Iron lath, of the form generally used, [cost \$1.25 per foot. Three coat plastering,] costs nine cents per foot." The words omitted are in brackets.

Respectfully yours,

P. B. WIGHT.

98 Broadway, N. Y., Sept. 8th, 1869.

Our correspondent, R. V. T., also calls our attention to this error, which arose from the displacement of a line in the locking up of the page.—ED.

MR. EDITOR:—I wish to know how Concrete pavement is made. Also, if it requires Hydraulic Cement in its preparation? Please give me an answer in your Magazine. A. D.

New Harmony, Ind., Aug. 15th, 1869.

Concrete pavement, or rather roading, may be made in the following manner:—Having laid out the required roadway, remove all extraneous matter from the surface of the road-bed, rolling said surface carefully and coating it evenly with coarse sand, to a thickness of two inches, on a perfect level. On this sand coat lay another, say one inch thick, but which shall not reach across the road by eighteen inches on either side. Roll each of these coats until they are firm and moderately hard. Next lay on

another inch coat, keeping it two feet at each side, within the width of the last coat. Roll it also. Put on still another coat of an inch, and do not let it extend within three feet at each side of the width of the preceding coat. And so continue until this sand foundation forms a desirable curve or arch for the model of the proposed road.

Now mix up in one or two troughs, say twelve feet square each, the following:—Gravel, 60 parts; sharp sand, 30 parts; hydraulic cement, 7 parts; slaked lime, 3 parts. Mix the two latter intimately with water, to the consistence of a thick cream, and, pouring it fairly over the two former, work up the whole mass rapidly and well.

In the meantime divide up the surface of the road (crosswise) into alternate strips of three feet in width, by means of boards set on end and secured against shifting. One box full will suffice for each of these strips of concrete. Having made several, and filled them to the required level or curve-line, let them set for a day; then remove the boards, and fill in between each pair of strips with concrete until all is flush.

Lastly. Go over the whole with a finish coat of equal parts of sharp gravel, ground brick, and good hydraulic cement, say two inches thick. Make a fair surface with serapers, and when the whole is moderately stiff roll it carefully, strewing fine sand over it at each rolling.

This, we think, will make a good permanent concrete road, rapidly constructed, and likely to outwear most others.

The concrete may be formed in cubical paving blocks, but they are hard to handle, and have no advantage over limestone or granite stones for the same purpose.

QUERIES AND RESPONSES.

L.—The word *Magnet*, as applied to the lode-stone, is derived from Magnesia, in Thessaly, where the Greeks first discovered it and its curious properties. The story of the shepherd on Mount Ida, named "Magnes," finding, and giving his name to it, is absurd. The translation of the Greek name is "Magnesian Stone."

S. E.—If "competitions" were fairly and honorably conducted, they would be perfectly reliable, and a very good way of drawing forth talent which otherwise might, for want of opportunity, lie dormant. But alas, the odds are fearfully against justice in the majority of cases of competition, and many a disappointed competitor has had sore cause for avoiding this one-sided trial of ability. We would not advise any struggling young architect to venture his time and means in it. A bird in the hand, however small, is worth two in the bush, however large. Await a certainty, rather than fly to grasp an uncertainty.

SIGMA.—None of the so-called cheap paints are worth anything. There is no good substitute for linseed oil as a vehicle. Our advice is to avoid experiments and follow experience, if you wish to practice true economy.

F. S.—A. T. Stewart's retail store, New York, is the largest on this continent, and, indeed, we doubt if it be not the largest in the world. It now occupies the whole block, having four uninterrupted fronts, respectively on Tenth and Twelfth streets, on Broadway, and on Fourth avenue. It is constructed of iron, and is, as far as possible, fire-proof.

Z.—Philadelphia has more Benefit Building Societies than any other city in the Union. All are thriving, and the number of houses (four, six, and eight rooms) is very great. Whole streets of them are springing, as if by magic, into existence.

QUERO.—No. Grace Church, New York, against which our English critics fire their heaviest guns, is the design of Mr. RENWICK alone; Mr. SANDS was not then connected with him. We must be excused from giving any opinion as to qualification or talent of any architect.

SPERO.—We cherish the hope that our American style will yet be developed. A people so imaginative, and so inventive as ours cannot fail to produce it, notwithstanding the empty objections of some of our journalists to any effort in that way.

PUBLICATIONS.

CONSOLIDATION.—That excellent specialty, *The Beekeeper's Journal*, has joined its destiny with that of the *National Agriculturist*, of Pittsburg, Pa., and now these Siamese twins together draw the public patronage at their new publication centre, the city of New York; where, in that palace of industry, 37 Park Row, in company with Scientific Americans, Revolutionary ladies, Manufacturers and Builders, they have established their bee-hive and gone to work with a will, to gather the honey of well-earned public opinion. Long live their queen! and long may they buzz on through the choicest flowers of literature, heedless of the critical drones which may seek to impede them.

The Beekeeper's Journal and National Agriculturist is a fine showy paper, beautifully printed on elegant new type, and filled with the choicest matter connected with its most useful mission.

NEW BOOK ON BUILDING.—Such is the title of a book of specimens sent us by HINKLE & Co., of Cincinnati, whose large establishment has been, for nearly forty years, turning out ready-made houses, cornices, mantles, window-frames, sash doors, columns; and, in fact, everything and anything that carpenters and builders may stand in need of.

The book before us contains numerous illustrations on wood, inclusive of sixty or seventy plans, elevations, and perspectives of designs, made by several eminent Western architects, of mansions and edifices built by HINKLE & Co. There are bills of quantities, shpping calculations, tables of useful information, and matter that is desirable to all either connected with the building trade or likely to want the assistance of this extensive and popular establishment.

THE
ARCHITECTURAL REVIEW
AND
AMERICAN
BUILDERS' JOURNAL.
—•••—
MONTHLY REVIEW.
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THE PAST BUILDING SEASON.

THE distinctiveness of character of two great cities was never so palpable as in the respective classes of buildings just put up in New York and Philadelphia. In the former city we find works of immense value prevailing all over: As though wealth alone required the architect's skill and builder's industry, and fashion in all its gaudy glare of ornament kept exclusive possession of artizan ability to astonish and confound the luckless lookers on at all this palatial effort of accumulated wealth, to let its bursting pride be seen and felt.

Philadelphia presents the sight of expanding limits to an astonishing extent. Whole streets are going up, particularly in the northeast section, where, a few months past, profitless fields of dank weeds, intersected by stagnant ditches, browsed over by herds of goats and an occasional cow or ill favored horse, were the only objects for the eye to rest upon. And what is to be esteemed as truly admirable is the fact that these endless successions of new streets are composed entirely of three story or of two story brick dwellings just suited to mechanics and laborers, the former class obtaining a comfortable six-roomed house, with bath-room, store-room, cellar, kitchen range, hot and cold water apparatus, and gas fixtures throughout, for a monthly rent of TWENTY-FIVE DOLLARS!

The second class, or two story dwellings, have four rooms, and attached kitchen, pantry, etc., and FIFTEEN DOLLARS is all the monthly rent required for them!

Now here is truly the paradise of the poor. Where every man can secure to his family a genteel private dwelling as long as he is able to earn the most reasonable wages. And is it any wonder that Philadelphia should be growing so rapidly as to leave memory of locality at fault?

How is it with the great "Empire City" in this matter? The toiling classes have to give way to the millionaires. And grand avenues of lordly brown-stone rear their highly enriched cornices to the skies as if in mockery of the shelterless poor.

The squatter on the barren rock, who clamped his old boards together to make a retreat for his wife and little ones, is driven forth, to let the excavators blast for the foundation of still another palace. And he may go where-soever he can, to be at no distant day again driven off by ever intruding and relentless wealth. But, the laboring class must be sheltered, and that too not very distant from their place of toil. For, even the millionaire with all his bonds and bullion, would indeed himself be poor without the assistance of that very class he looks so proudly down

upon. Cooped up in narrow limits, with lofty business emporiums crowding every street, where can the artizan find a convenient home for those he loves and labors for? The greedy capitalist, with a sharp eye, seeing the urgent want of the helpless man, forthwith rears a tall barrack of numerous rooms, and makes his tariff of charges to suit, not the needy one's state, but his own well-calculated interest of his outlay.

Thus are the poor disposed of in New York; and those of them who are fortunately able to avoid these "tenement houses," and procure a place of shelter outside of the city, have to cross the water and pay through the ferry and the railway their daily tribute to grasping capital for the privilege of purer air.

If, then, Philadelphia, as things are, be the paradise of the poor, what must New York be?

The conclusion is not to be eluded. Left dependent on philanthropy, what is the hope of the New York mechanic? Year after year rolls up the value of real estate, and even churches venerable in years, and, one would suppose, dear in associations, are regardlessly torn down to give way to the requirements of commerce. How then can it be expected that the landlord of the "tenement house" can afford to stand still when neighboring capital goes up in value. No, he won't, he must have his "pound of flesh," and that from the side of the poor sufferer who is, per force, his tenant.

Mr. A. T. STEWART is laying out a village on Long Island expressly for the benefit of the working class. But, with all the goodness of intention, can that great millionaire bring it near to New York, where the artizan has to work? The toil and the cost of travel must be the tax on the poor man still; and in the freezing mornings of winter he must leave his warm bed an hour or two earlier to secure the chance of travel to the great emporium that gives him the means to live.

But even such drawbacks are unworthy of a thought when compared with the pest-houses he has to endure in "tenement" life, and thrice blessed is STEWART or any other name that charms his weary brain into forgetfulness of his daily drudgery in the enjoyment of health and home comfort.

Philadelphia has much to be proud of in the comfortable homes she presents to her working classes, and they in return will not fail to see in the city of Brotherly Love much to admire in the midst of their contented enjoyment.

On the whole, the review of the past building season presents many pleasing features. Several fine buildings, civil and ecclesiastic, possessing attractive effects of architecture, have been erected, and as we have said, great and most desirable additions have been made to the humbler but larger class of dwelling houses in the city.

New York can boast of the GRAND HOTEL, a splendid edifice just completed on Broadway. Mr. A. T. Stewart's Lodging House for working women is in the foundations as yet, but even these show what a permanent good is intended.

Numerous splendid residences have been commenced, whilst others have been finished.

The great marble Roman Catholic Cathedral grows in grandeur to its intended height.

Churches, hospitals, and schools spring up everywhere; and Union Square, once the refined retreat of the Upper Ten, is now going rapidly into business.

Tiffany, that prince of jewellers, having profanely swept away the norman church of the Puritans, is placing in its sacred stead an iron edifice of promised elegance.

Baltimore is to have a fresh monument of Peabody liberality, which, we sincerely trust, will make amends for the many demerits of the present building.

A NECESSITY FOR STATE ART SCHOOLS.

IT is a strange and unaccountable fact, that liberal monarchies are more careful of the instruction of their people in the Arts and Sciences than is our great Republic. The student in Europe is aided and assisted to the utmost in acquiring a thorough knowledge of his chosen study. The best professors are paid to teach him. Structures the most suitable to his requirements are erected and endowed. Royalty spreads its golden sceptre patronizingly over the institutions formed for his mental advancement, and premium and reward urge him on the race of worthy ambition.

Is it any wonder then that Europe should be able to furnish us with scientific mechanics to build up our name in the world? It is true we have put forward native genius of no common stamp, and given forth a fair share of scientific knowledge for a young nation, of which we are pardonably proud. Our mechanics and professionals have welcomed the advent of these well-schooled contemporaries, and gladly accepted the light of improvement they opened upon us.

In Europe this fostering of scientific ability has given rise to a wide spread system of publication in aid of the effort, and the schools, the laboratory, and the lecture-room, are sustained in their indefatigable teachings by the concurrent instruction of the most elaborately illustrated books and serials. These, too, our people subscribe to and take with avidity.

In view of this easy attainment of sound, useful, practical education for the mechanic, is it to be wondered at that monarchies are not alone endured, but freely upheld by the European nationalities? No matter how great the load of grievances under which the people groan, this gift of education is all-suffi-

cient to make them sustain the gilded burden.

As we have said — it is a strange and unaccountable fact, that monarchy should thus provide for its subjects, whilst a Republic, such as ours, great in the present, and illimitably greater in the future, should be apathetic, if not wholly regardless of the scientific development of the national mind.

We do not wish now to look critically at the root of our educational tree, or to make any comment on the political system which pays a primary teacher, who does not speak correctly, to instruct the rising generation at the very period when mere imitation will do more than abstruse English grammar. Our present object is to examine into the wants of the working classes in the matter of suitable mental nourishment, and to see whether it is incompatible with the nature of our system of government that due care should be taken of the higher branches of common-school education, and the giving that aid and patronage to scientific instruction which it should have, and without which it is indeed a difficult matter to sustain institutions for its benefit.

It is a grand mistake to spend the people's money on the highest branches of the tree of science, whilst the trunk is left to famish for want of cultivation. Popular information is of practical importance, and that can only be supplied to minds already understandingly prepared to receive it. Popular scientific education is therefore a demand which should be met generously and without delay. Political science is but too indulgently nursed in its stead, and will never gain to the nation the same amount of credit that practical science will. The telegraph, the railroad, and the steamship have not to thank *party* for their blessed existence,

and the mighty press itself owes nothing to Democracy or Republicanism, but on the contrary they owe all that they are to it.

The great difficulty with which our country has to contend in the question of art-education, is the positive inability of our State government to act in a manner conducive to the founding and protection of such institutions. The very power of the government is but the mere representative of a selfish aggrandizing party which is bestowed in trust for their own special advantage, no part of which looks to the advancement of the intellectuality of the mechanic or professionally scientific man. The consequence is that individual struggles are more common here than elsewhere, and that he who has hitherto sought the attainment of that education which his innate genius craved for, had to turn his back to his native land and seek the liberal privilege in the midst of that monarchical despotism he was early taught to abhor.

Thanks to immigration, we have now amongst our trades and professions men of education, from whose superior endowments we can improve ourselves. But is not this a state of things to be blushed for? Well may monarchists point in triumph to those polytechnic institutions, which do so much for a nation and give it such a mental supremacy; and well may Republicanism ask of itself the question, whether the people will it that no special aid should be extended to develop the intellectual power in their midst?

There is *lobbying* for new railroads, bridges, canals, and in fact everything which can promote commerce and the inflation of wealth among the elect of fortune. But, not a solitary effort for the promotion of native talent. So utterly dead to every national feeling on this subject are the people at large, that the public press never proposes anything leaning that way. The leading editorials are usually assaults or de-

fences of some political men or measures, and even in their notices of new publications, science is but squinted at, whilst political economy, or a startling novel, gain access to a column or two.

We trust that the growing sense of this great nation will yet awaken to the situation, and peremptorily reform this damaging state of things. Congress should take the lead and legislate on it. Special appropriations should be made to each State for government Art Schools, open to all, influenced by no clique. And each State should add its appropriation in the shape of a tribute to the national intellect. No dependence on mere private benevolence, which at best is but a charity. The people have a right to such Art Schools for the education of themselves and their children; and the truest and best mode of establishing such is to make them thoroughly independent of party of any denomination whatsoever. Let the best professors be induced by liberal salary to come from Europe here; and retain also those who are here. Let the doors be opened freely to all to study or observe. Let the people have a chance to know what science is. Let reward and honor await upon the meritorious students. Let every branch of science have its fair share of development, and nothing that is attainable be wanted to draw forth the national taste and ability. That the people are liberal is evidenced in the salaries which are paid to popular preachers. That the people would amply remunerate professors who would make science popular and easily attainable, argues merely their common sense. Why, then, shall we not have government Art Schools?

In all the round of school studies there is not one so completely neglected as that of Architecture. School masters know nothing of it. Nay, principals and professors of colleges generally know nothing about it. Our newspapers never venture on it. And if they are, out of the commonest courtesy,

obliged to notice any architectural publication, they do not read it, any more than if it was in an unknown tongue. How, then, should the people have any notion of the nature or merits of an art whose works they see, but whose principles they have never been taught to understand. Spiritualism they are treated to, but Architecture is a sealed book to them. As old as Creation itself, it is as little known as the very deepest of the sciences; and writers who will flippantly descant on chemistry or, if necessary, astrology, without a slip, cannot speak of a "style" in Architecture without calling it an "order;" and this flagrant error we have frequently seen committed by writers of a high class of intellect who may be forced by circumstances into a passing notice of this occult science.

Very recently a leading journal of this city took exception to an editorial of ours on the necessity for a distinctive national style of Architecture, and sagely remarked—"With almost the same propriety might be queried whether we are ever to have a distinctive style of *singing*, of *steam engines*, or of *apples*."

The italic dress is that in which we choose to livery such folly.

Our critic then proceeds to acknowledge that: "There may, in time, perhaps, grow up an *order* of architecture that will be more or less peculiarly ours. But the tendency of the world is toward a grand cosmopolitanism. So soon as we find something superior to what exists anywhere else, it will be everywhere adopted, and be American only in origin."

Now it is to give light to darkened intellects like this, that art-teaching is as requisite as to the mechanic who gets his living by a knowledge of Architecture or any branch thereof.

Were it worth our while we might riddle his ridicule to dust, but we will be content with simply asking the writer if there are not distinctive styles

of singing, of steam engines, and even of apples? And, finally, we would ask, in the name of common sense, what analogy there is between either of the three and the science of Architecture?

State Art Schools are a positive necessity; and we hope, for the sake of the national character as a progressive country, that the United States of America will no longer, in this matter, be behind the monarchies of Europe.

DECIMAL MEASUREMENTS.

EVERY Architect and Builder, who has to take out quantities for estimation, feels seriously the inconvenience of the existing system of admeasurement which we Americans, regardless of time and trouble, so faithfully follow as derived from the conservative stupidity of our English progenitors.

The French, with that quickness of apprehension so innate in the Celtic character, early saw the advantages of and at once adopted the decimal system, not alone in their money tables, but likewise in their weights and measures. Thus giving to every branch of science a facility of computation which must render the calculations of the chemist, the astronomer, and the mathematician alike easy and agreeable. Geography has acquired by this decimal system a nicety of gradations which puts science in possession of all the wonders of the several elements as connected with that study. So assured are we of this that in railroad surveying we adopt the decimal system, although in fact we are no more than measuring on a large scale. If, then, it be found so desirable to apply the decimal system to railroad surveying, why not also make use of it in the lesser branches of geometry? What sense is there in dividing a foot into twelve inches, when ten divisions would make less work for the calculator? And why should sec-

onds and *thirds* of inches be duodecimated instead of decimated? A yard would be no less at thirty-tenths (or three feet) than at thirty-six-twelfths.

Here let us ask why our city and county surveyors do not adopt the common sense system of the railroad surveyors, and drop the *pole* or *perch* absurdity?

The carpenter in making his measurements has often to use fractions and fractions of fractions, or as they are called compound fractions. How simple would be the same operations decimally performed.

But why multiply evidence of what is so self-evident. We have adopted the decimal system in our monetary matters, and that we do not extend its advantages to measures and weights is something unaccountable. Of course it will one day force itself upon the country, as the necessity of a progressive and time saving age. Why not now?

CAPE MAY REDIVIVUS.

FIRE is an ardent reformer. Furiously destructive in its course, it ruthlessly sweeps all before it, and if unobstructed it would not leave a vestige of anything liable to its fearful fangs. But its course is soon filled up by the hand of improvement, and that which was deemed a ruinous career of devastation eventuates in a positive advantage.

That growing favorite bathing resort of our summering citizens, so aptly named Cape May, was at the close of last season made the scene of a destructive conflagration, which at the time drew forth the strongest expressions of regret from all who had become pleasantly acquainted with that recreative locality. Our American spirit is not to be permanently controlled, however, by events such as that we allude to; and accordingly the debris of the catastrophe is quickly cleared away to

make room for newer and better buildings. Improvements that might have been wished for are now attainable and demanded.

Congress Hall partakes of the feast of improvement, and undergoes changes, much for the better, making it, with the additional wing, nearly three hundred and fifty feet long. And providing sleeping accommodations of one hundred and seventy-five apartments.

Several new and elegant dwellings and stores are constructing, and plans of improvement are in course of development.

S. D. BURTON, Esq., of this city, is engaged as one of the Architects, and is bringing tasteful design to bear upon the field of blackened destruction. There was room for improvement at Cape May, no doubt, and the clearance which the devouring element has made will afford, at all events, ample opportunity for most desirable reformation, and offer to the health seekers of next summer fresh features for observation, and additional means of enjoyment.

INSTITUTION OF NAVAL ARCHITECTS.—The Council of this institution, the importance of which is now so far recognized by the British Government as to command an annual grant from the public funds, are desirous of receiving special information on the following heads in time for their next annual meeting:—1, composite shipbuilding; 2, economy of fuel; 3, the application of steel in lieu of iron to shipbuilding; 4, iron and steel masts and yards. Practical men, in possession of new facts or interesting results relating to any of the foregoing subjects, are invited to embody them in papers to be read before the institution, or to forward any results, numerical or otherwise, which may have come to their knowledge, to the secretary, at 9, Adelphi-terrace, W. C., London.

COMPOSITION FLOORING.

TO a people well used to wood as a material, and surrounded on all sides by it, how little thought is given to the straights to which all those are driven, where its scarcity is the rule. Suffering under a deprivation which Americans can scarcely understand, we find the habitations of the humble classes of those countries supplied in its absence with artificial material of every possible contrivance.

The cottiers of England are contented, if not happy, in the possession of floors and roofs which our poorest people in the United States would not dream of using. And all because of the want of wood or (as we call it) lumber.

Cement floors have some points in their favor, the chief of which is that they are fire-proof, and in sultry climates no despicable recommendation is that of their coolness. Such floors are found very general in Italy, France, and Germany, and in some parts of England. In America they are unknown, save to emigrants from those countries where they are used.

The following is a description of them:—The flooring joist are set in place in the same manner as for boarded floors, and well bridged. (Herring-bone bridging is best.) Some floors are first laid with reeds; and others are covered with double laths, the ends of which should only just meet in the middle of the joist. The cement is laid on half an inch or two inches thick, and the floor must not be left by the workmen until it is quite finished; that is, they must be beating and smoothing it over, night and day, till it is completely set, in order to prevent its cracking. This can only be done by having a swinging scaffold for the men to work from. The cement must be laid on directly it is made; therefore, while some persons are making it up, others must

be laying it on. The cement is commonly called red plaster, which is red gypsum. It is burned for this purpose, by making a fire with small billets of wood, and mixing small lumps of gypsum with the wood, and then covering the whole with sods, or turves, to prevent the fire escaping, in the same manner as billets are covered when they are made into charcoal; or a better way is to grind the gypsum in the flour-stones of a mill, and then bake it in an oven, before mixing it into a cement, which should be done with the iron dust which falls from a blacksmith's anvil, and not with the smithy ashes; the scales of iron being so much harder and better for the purpose, though ground floors for cottages and barns are frequently made of these materials, well beaten together.

In France and Italy, tiles laid in cement are frequently used even for upper bed-room floors. They are usually laid or set in cement, in strong lathing, and in double courses. But such floors would be highly objectionable in this country, as being more expensive to us than wood, and not as pleasant in the cold season.

For floors of laundries, dairies, cellars, &c., tiles are excellent, especially so, if well glazed, so as to resist the absorption of water or damp. A good floor for malt houses, or the like, is made by taking equal parts of lime, sand, and cinder-dust, worked up well together. But, as in the process of malting, they are occasionally moistened; this composition may not be so well adapted for the bed-room floors of cottages.

Clay floors composed of a mixture of clay and marl are still in use in some parts of England for malt-houses, hay-lofts, cottages, etc. They are made of clay and marl, mixed with chopped straw, well trodden by horses, and

mixed thoroughly in the same way as sun-dried or mud bricks. Sometimes bullock's blood is added, with good effect. The success of such floors depends altogether on the thoroughly mixing and working of the material.

Of course we must not be understood as recommending these composition floors to our countrymen, who are blessed with the presence of abundant forests, from whence to take a sufficient supply of a material so much better adapted to man's comfort and the progressive improvement of his civilized condition.

CISTERNS WITHOUT BRICKS.

GOOD cisterns may be made without using any bricks, except to form the arch or dome. In the first place, strike a circle about seven feet in diameter, and excavate to the depth of from six to ten inches, leaving the surface level, then within this strike another circle some five and a half or six feet in diameter, and excavate to the proper depth, leaving the diameter at the bottom somewhat less than the top; making the sides as smooth as possible to receive the cement.

Now with three or four hundred of what are termed hard bricks, form an arch or dome over the cistern, instead of covering in the old way with timber; this can be done by laying down the first course of bricks, end to end on a layer of mortar that is somewhat thicker at the outer than the inner edge, so as to elevate the outer edges a little; now lay the second course with very little mortar between the inner edges of the bricks, and considerable between the outer edges, so that the latter course shall have a greater inclination than the former by about half an inch; continue on in this way until the bricks have attained an inclination of about forty-five degrees; now reverse the order of

laying them, putting very little mortar between the outer, and considerable between the inner edges, until they come to lie level; the thing must be so managed as to have an aperture at the top sufficiently large to admit a man to clean the cistern, (about sixteen to twenty inches.) The mouth should be somewhat elevated, so as to bank up sufficiently to place the dome below the action of frost; the dome must be covered with cement, both inside and outside. Such a cistern should first receive a coat of cement, directly upon the earth sides, two parts of sand to one of cement. The bottom should be served in the same manner. When well set, apply a second coat of cement, composed of equal parts of sand and cement, and when hard, the arch is to be constructed.

There may be some soils so loose and sandy that a cistern cannot be made in this manner. In such a case, to save expense, use cobble stones, about the size of a goose egg. They can be laid up in cement to stand just as firm as brick, and are just as good. A waste-pipe should be inserted near the top to discharge surplus water, and an aperture, on an inclination downward, to admit the pump pipe, from the house. This hole should be cemented perfectly tight after the pipe is inserted.

Many farmers could, if they were disposed, make their own cisterns complete, except to solder any lead-pipes that may be required. A man of tact will learn to use a trowel in half an hour, so as to do a fair under-ground job, and the mixing of the cement is very easy. All you have to do, is to mix it no faster than it can be used before it sets, and all will be right. Do pitch those old hogsheads, under the eaves of your houses, upon your wood piles, and make a cistern for your poor, broken-down wives and daughters at once. Now is the time to do it, before cold weather sets in; in the spring you will have no time to build one.—*Rural American.*

THE INDURATING OF WOOD.

WHILST the question of the best mode of fire-proofing our buildings, either for domestic or commercial uses, is agitating the public mind, it may not be uninteresting to draw attention to the various modes of indurating or rendering hard the great staple material of the building world.

There are several methods of preventing what is called the *dry rot*; and each and all of these methods call for solidification, which once attained is also a preventive of combustion.

Iron is the prime favorite with all those who desire to promote the great cause of defence from fire, and no doubt that material is good, not alone for this purpose, but for great adaptability to the requirements of design which it presents to the Architect and Engineer. But iron is itself subject to difficulties which are not to be found in connection with wood, and which cannot but prove obstacles in the way of its supremacy as a building material.

Wood has many virtues which will always retain for it the support and advocacy of builders generally; and the one great difficulty of combustibility being overcome, there remains little or nothing to be said against its continued reign. It will then be, more than ever, the material of all, the rich man and the poor, the palace and the cottage.

We will not now review the various methods by which wood has from time to time been rendered impervious to heat and moisture, and consequently to fire and decay. But simply remark, that each has its drawback; even that most popular of all, the "Kyan patent," which being a treatment by corrosive sublimate, had the undesirable property of salivating carpenters and joiners who worked the stuff prepared by it.

Lately, in Paris, M. Maurice Boucherie, of that city, read a very interesting paper before the French Academy of

Sciences, extolling the injection of a solution of sulphate of copper into wood, to increase the durability of the latter. The best way to perform it is by displacing the sap, and then letting the wood dry in the air. To prove his assertion, M. Boucherie exhibited some railway sleepers laid down in 1847, which were found to be in excellent preservation, and harder than common dry wood. The wood owes its excellence to the combination of oxide of copper with the cellulose of the wood.

What the objection to this treatment may be remains to be seen, but we fear that there is a palpable similarity to that of Mr. Kyan. In fact there is nothing new beneath the sun. But it matters little whether a discovery be new or old provided it be practically useful, and the introduction of a means by which wood can be so treated as to render it perfectly fire-proof, and unsusceptible of the principle of decay without making it at the same time difficult, if not dangerous to health, to work it, is "a consummation devoutly to be wished."

THICK TRACING PAPER.—A most useful invention has just been given to the arts by a Frenchman, namely, the rendering any thickness of drawing-paper perfectly transparent, by dampening it with fresh benzine, which has the desired effect, and permits of the drawing on its surface in India-ink, and likewise the use of water-colors; thus giving a great advantage over tracing-cloth.

The paper resumes its opacity as the benzine evaporates; so that any place that has not been duly traced must be re-damped with the benzine for that purpose. A sponge is the most suitable medium for the application.

All draughtsmen, whether surveyor, architect, or engineer, will at once recognize the utility of such a discovery.

DESCRIPTIONS.

GALVANIZED IRON.

SCIENCE has seldom conferred a favor on the Building Art more thoroughly desirable than that of the galvanization of iron. Before the discovery of that defensive coating it was quite impossible to use iron in exposed situations, such as it is now so generally used in. A few years back, wooden cornices were the only available substitutes for stone, and every one knows how frail they were, and how inflammable; conveying and extending fire with most destructive facility.

Sheet iron could be cast to suit the purpose for which the treacherous servant, wood, was used, but for the stubborn fact that the weather would act so rapidly upon it, oxydizing and excoriating it, in spite of paint or any other then known application.

Stone cornices were expensive; to such a degree that in the Roman style the Composite Order was never used, and even the Corinthian seldom, owing to the required outlay for stone-cutting of a superior class of workmanship. The substitution of wood, whilst it pretended to humble the pretensions of the architectural intention, also had a bill of cost attached to it for intricate and delicate carving, which, added to the fact of its being but temporary, and, what our English friends would justly term, a sham, went far to make it desirable to better the condition of our builders by giving them some material less costly than some other material more permanent and indestructible by conflagration than the other.

As we have said, sheet iron was known to be capable of answering the desired purpose; and Science, ever watchful for the advancement of the arts of civilization and refinement, did not fail to find a fitting preservation for the exposed

metal. Galvanizing was the proposed method; and at once it became popular to that degree that cast-iron cornices were forthwith in active demand, and architectural iron works began to turn out patterns of every form and of the richest design. The Composite Order, hitherto under bann, now began to show its meretricious beauty in our street fronts; and the new idea of galvanized iron was ardently grasped by our architects, who at once found themselves in possession of a material which set them at liberty to design their compositions *con amore*, and carry them out undeterred by the long existent bugbear of expensiveness.

(Zinc alone also became useful in this connection forming a light eoronal finish, where lightness was an object.)

The accompanying designs were made expressly for the manufacturers J. P. Stidham & Co., of this city, a firm that has done much towards perfecting this material by their practical good taste and liberal enterprise.

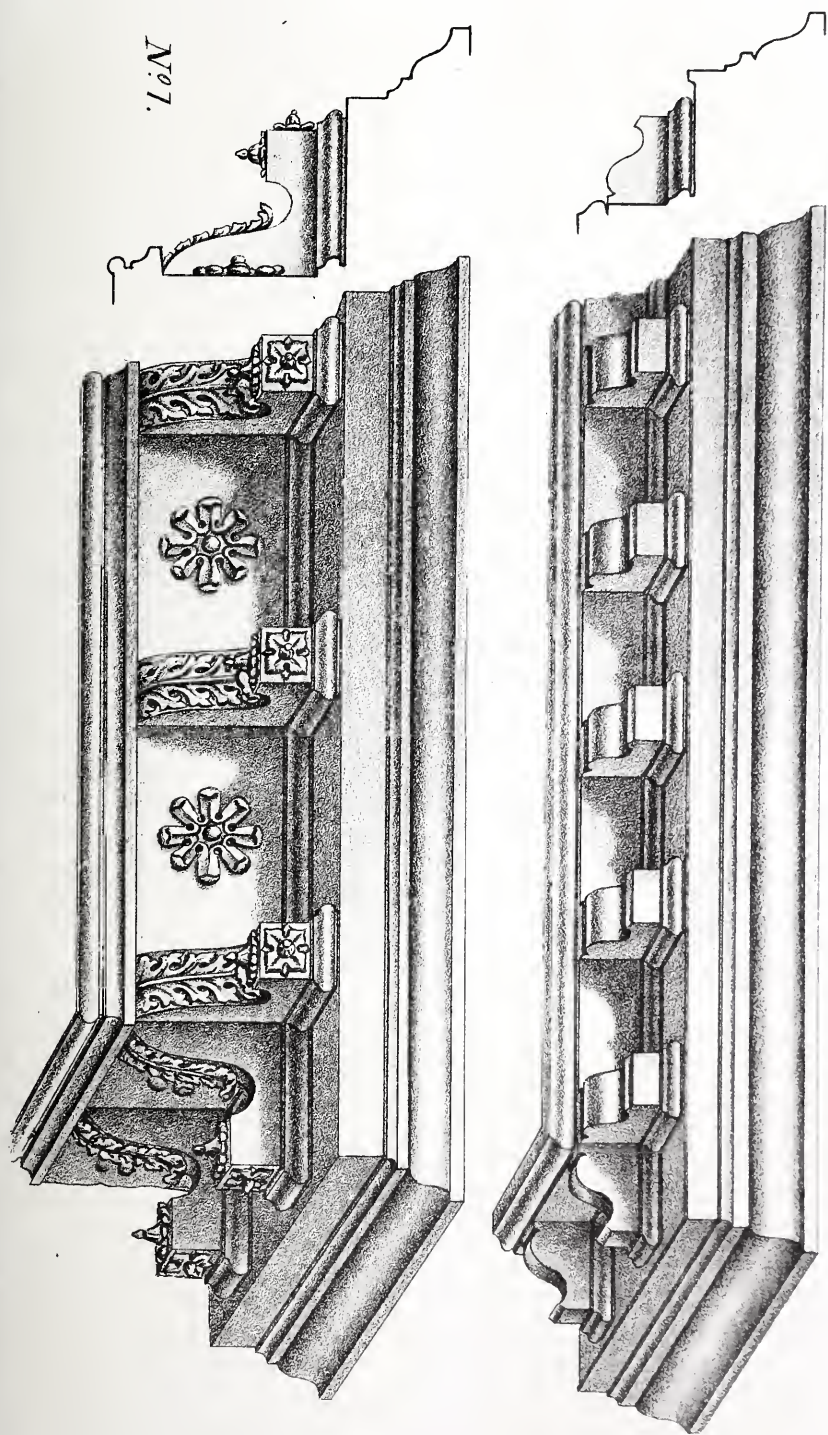
PLATE 1.

The first castings of cornices were necessarily very plain, as the idea was as yet but in its experimental state, and the founders did not wish to venture much. The upper figure in this plate shows the plain design which first appears. The second figure shows a slight advance in the road to ornamentation; which in itself would at once establish the fact of its advantage over wood, and especially over stone, in the matter of expense. The first cost of the model being the chief outlay of earving, which, in either of the other modes, would be so evidently greater.

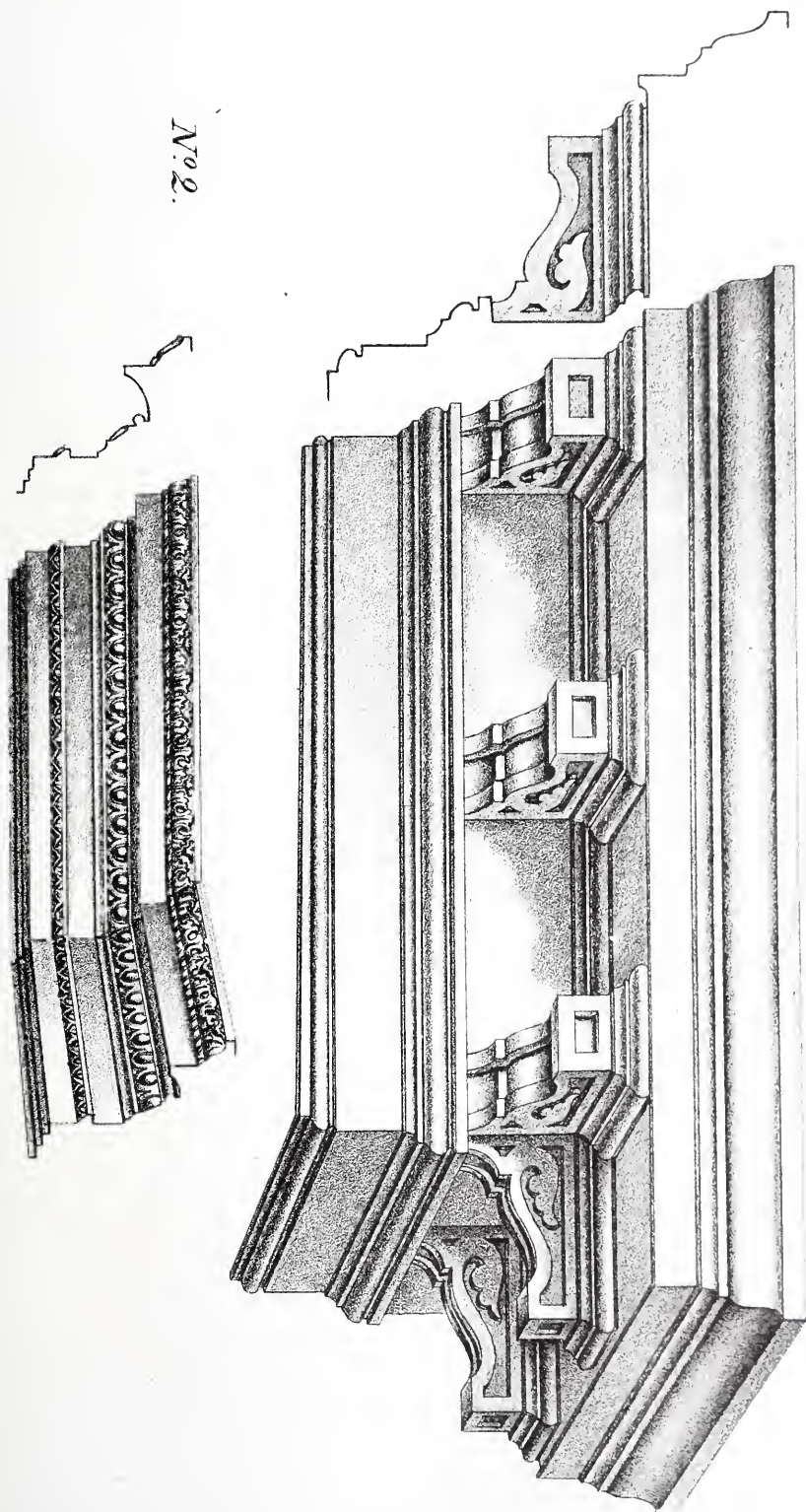
PLATE 2.

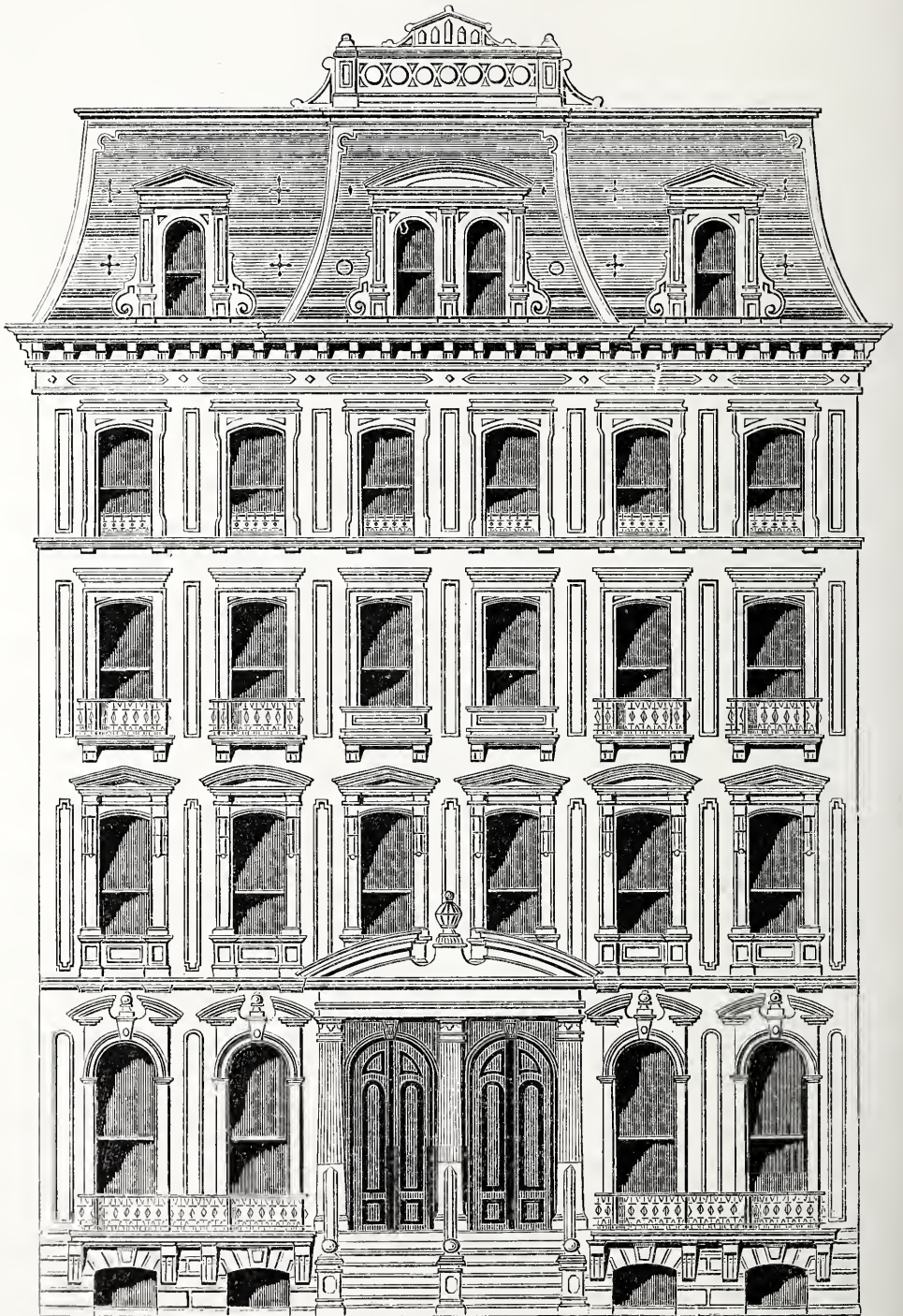
The upper figure shows a larger cor-

N^o 7.



No. 2.





TWIN DWELLINGS

nice, being also an improvement in style on its primitive predecessors; yet still it is timidly modest, for the iron workers dreaded to go beyond their depth and trust themselves too much to the fickle tide of public opinion. The lower figure is small, but ornate, and was intended for the cornice of a store.

The favor of the public was now so far gained for the galvanized iron, that capital was freely ventured, and architects most liberally patronized this new and excellent introduction.

PLATE 3.

The main figure in this plate will show the spirit of improvement in style which now began to actuate our architectural iron workers. The Roman Corinthian made its appearance at last, and in a creditable manner, establishing now beyond any further doubt the ductility and economy of the metal over its adversary materials.

Pilasters, half columns and three-quarter columns, followed into the new-made field, and were soon supported by detached columns, and, in short, all the intricate delicacies and elegancies of the most enriched design came forth to maintain the claims which galvanized iron had now upon the public favor.

PLATE 4.

This is a still more enriched Corinthian cornice in the Roman style, and one of very great beauty. Such may now be seen almost anywhere in our best streets of the cities of the Union, adorning the palatial homes of our merchant princes.

Of course, the exquisite but costly work of the carver in stone is in requisition, notwithstanding the popularity of galvanized iron; and it is right that it should be so, for with all its advantages of permanency, cheapness and safety, the metal is but a makeshift for the genuine material, which, by the aid of paint, it is meant to represent. In this light it is as objectionable as wood.

The man of taste, sustained by ample means, will spare no expense to procure the best carvers in stone to carry into effect the most elaborate designs of his accomplished architect, so that the finished workman will find that his calling, so far from being invaded by the casting process, is, on the contrary, advanced and greatly improved through the palpable lessons in architecture which the latter so widely bestows upon the public observation, and which is certain to create a taste which want of such a cultivating process has hitherto retarded.

Carved stonework is legitimate; and all who can afford to have it, will not fail to give it the preference to any substitute, however close may be the resemblance.

TWIN DWELLINGS.

WE have given several designs already for this class of houses, and advocated their claims on the attention of those who build, with a view to effect in appearance as connected with street architecture. That the advantages possessed by this mode of construction are duly observed and acknowledged by the public, is distinctly proved by the fact of the erection of so many of them in all of our cities throughout the Union. Nor do we limit their existence to this country; they have been favorites in the cities of Europe for half a century, and may be seen at this day rising in various designs of finish in the best streets of the leading cities of the Old World.

The illustration here given is designed in pure French style, as now practiced. The material is intended to be stone, of such tint as may suit the taste of the proprietor, for the appearance of such a front would be good in dark or light stones, brown stone or white marble. Or even a medium tint, such as that of Ohio free-stone, would give a very

pleasing effect. The characteristics of the design are *Paladian*. The pediments of the first-story hall doors and windows are open cornices, making way for the introduction of a spherical finish resting on the keystones of the window heads. The pediments over the windows of the second story are alternately angular and segmental. The remaining stories have no pediments crowning their windows, but flat caps instead.

The piers are panelled with circular-headed panels on the first story, stepped corner ends on second story, and square panels on the remaining stories. The frieze of the main cornice is ornamental, with horizontal panels and lozenges.

The principal windows are all furnished with balconies. Those of the first story are of stone pierced; each including two windows. Those of the second story are panelled and independent. The third story is provided with pierced balconies on the sides, and panelled in the centre. On these three stories, just designated, the balconies are projected on brackets or consoles in relative proportions.

The fourth story has ornamental iron guards; and it will be observed that the cornice has no balustrading, the intention being to leave an uninterrupted view from the windows, as well as to give the whole of the finish above the cornice a fair display.

All the balconies mentioned are intended to be enriched with choice flowers in vases; and this beautiful custom, which so generally prevails in Europe, cannot be too soon introduced into this country, where flowers command so much attention.

The roof is of the favorite *Mansard* pattern, with the addition of a pierced panel crest to break up the monotony of the horizontal curb. It is covered with ornamental colored slating.

The hall doors and windows are of black walnut. The latter glazed with French plate glass throughout.

The plan may be any of the stereo-

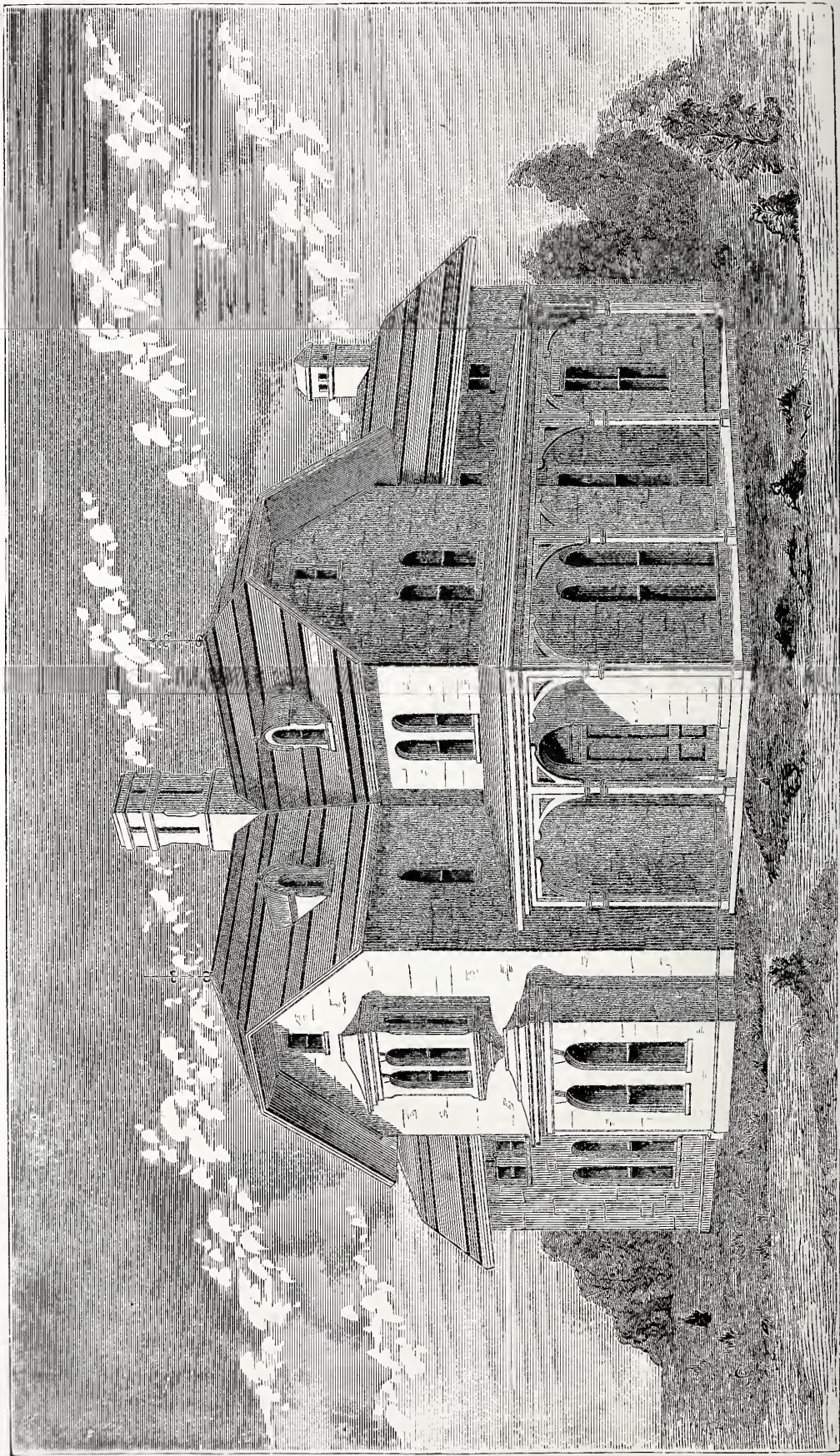
typed arrangements, necessarily limited, which such compositions are laid out in. The halls being wide; the parlors spacious and communicating; the basement lofty and convenient; the bed-chambers of the upper floors fitted up with all the necessary accompaniments of dressing-rooms, closets, &c., such as are looked for in such houses. The joinery should be of the most workmanlike description, and the woods of the choicest selection in beech, maple, butternut, walnut and rosewood.

In fact, now-a-days our interior finish is of an excelsior class, which holds admiration tributary to it, and calls for the utmost skill and nicety of the most accomplished workmen. Everything connected with the finish of such houses must be in perfect keeping, and all of the best.

To meet the constant requisitions of ever-changing fashion, every branch of mechanic art is taxing its inventive powers to produce elegant novelties, alike combinations of utility and taste.

Where a front, as in the example under consideration, is designed with a view to attractive grace and elegance, it becomes absolutely necessary that the interior finish of such a house should be equal to or more than the expectations its appearance externally has given rise to. Any falling off is a disappointment to the visitor, and will be the more marked in proportion to the estimation he has formed of the exterior. When we see a man of elegant appearance, and are at once induced to attribute commensurate mental qualifications to him, how great is the reaction in our admiration when we find him inferior to our estimate of what such a looking man should be.

It is precisely so with a dwelling. If the interior be not fully up to the standard of taste which the exterior has impressed our mind with, the whole is an irretrievable failure, if not a despicable cheat.

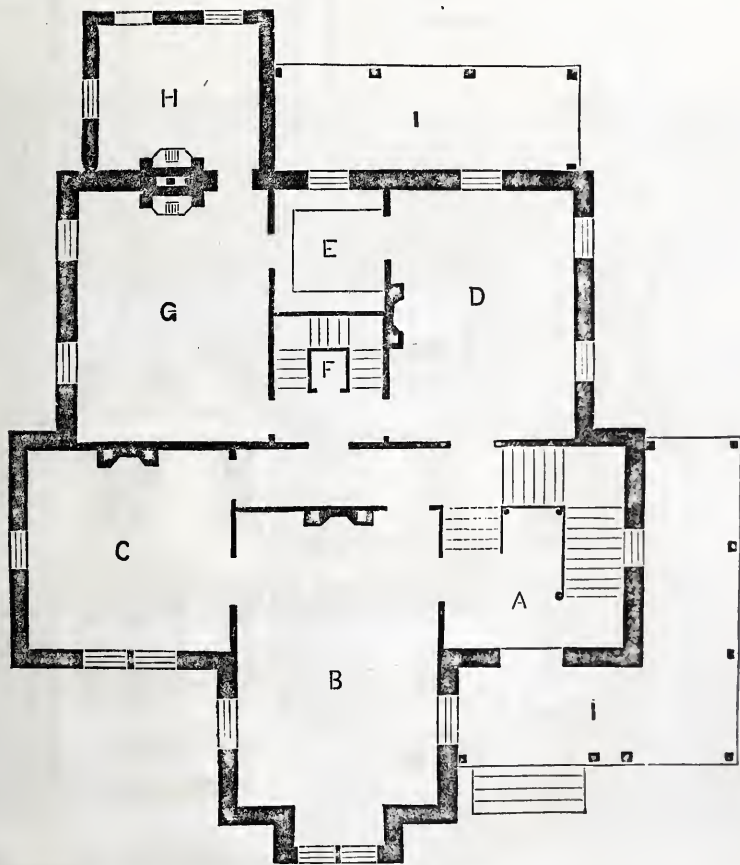


SUBURBAN VILLA.

A SUBURBAN RESIDENCE.

MASSIVE effect, with strength of light and depth of shade, are the evident characteristics of this illustration of a class of *rus in urbs* residences, which so generally spring up around our cities to adorn their outskirts. The semicircular headed opes have here a peculiar significance in connection with the crowning feature, the truncated roof. The whole mass appears to be in unison with its parts, and all convey the idea

draught. We have before called attention to the subject of misplacing chimnies, and yet feel it incumbent on us to urge on our friends the necessity for avoiding the too common practice of setting flues in the outside walls of a house. It cannot but be evident to every mind that the cold, or at least cooler, outside wall must prove a damper on the ascent of the smoke in the flue and hinder its easy escape; in fact pressing it back by its own condensed weight into the room from which it emerged.



of strength in repose. The plan is well calculated for a most comfortable dwelling, giving unlimited advantages of view from the windows, as well as securing the greatest possible amount of ventilation. The heating is economized by the chimnies being placed invariably in the interior, rather than the exterior walls; thus avoiding the loss of heat, and at the same time securing a perfect

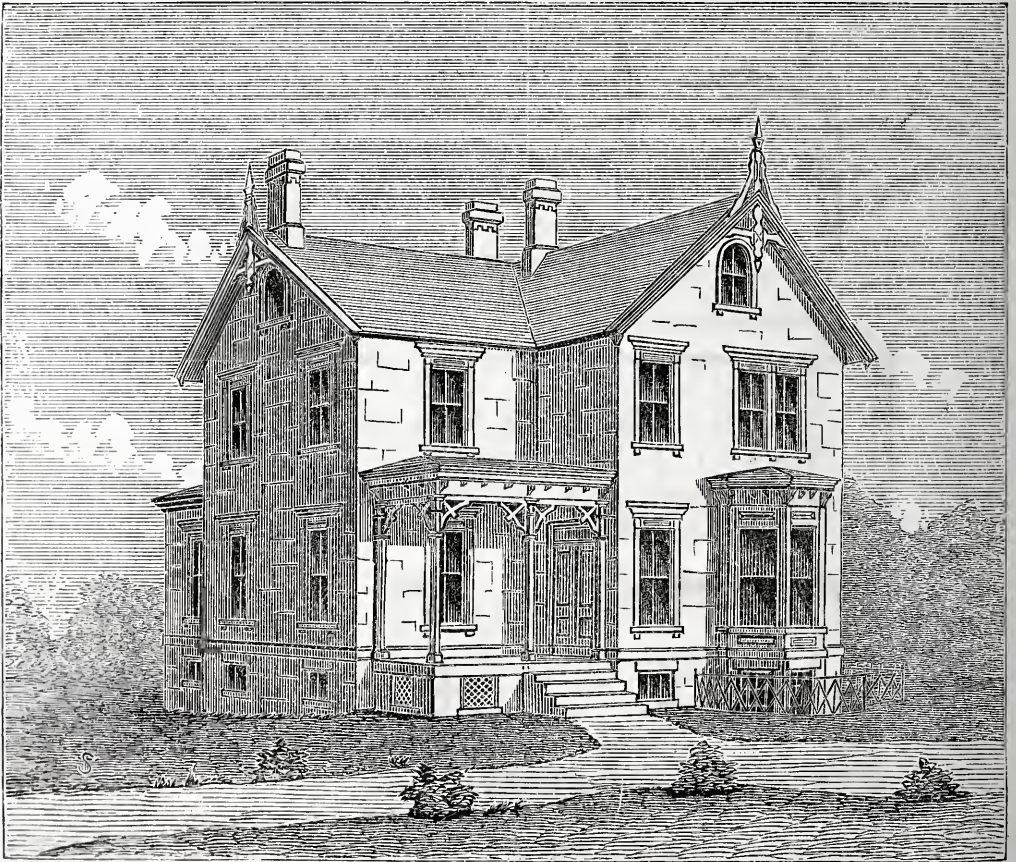
This house was built, and gave all the satisfaction which might have been expected. The plan of it is as follows:

A, Vestibule and staircase. B, Drawing-room; a handsome apartment, lighted with windows on three sides, the centre one being a deep bay window. C, Library, to which access may be had directly from the drawing-room, or from the hall-way. D, the

Dining-room, lighted by windows on two sides, and entered from the hall-way. E, Pantry, connected with both kitchen and dining-room. F, Back stairs. G, Kitchen, separated from the hall by the passage in front of back stairs, which likewise leads to the dining-room. The door in the hall-way being shut effectually cuts off this passage, and all communication between the executive and reception parts of the house. H, the Washing-room, conve-

nient in all respects, and well lighted. I, I, Front and rear Verandas. These might, with advantage, be connected.

Built with sand-stone, or any of the light-brown free-stones, this suburban residence, with its ornamental slate truncated roof, would make a most desirable retirement for the successful merchant or banker. Surrounded by tastefully laid out and well-kept grounds, it would be a desirable feature in the suburbs of any city.



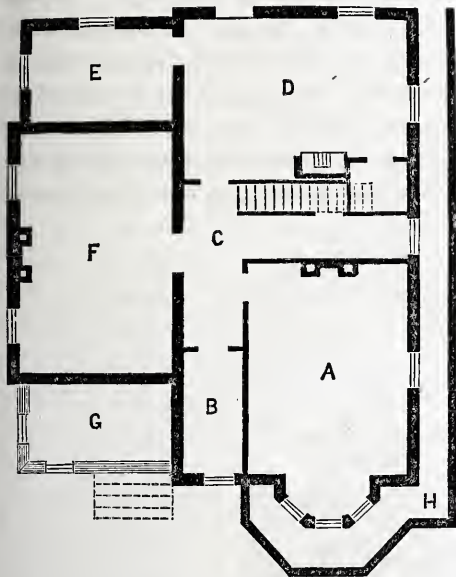
COTTAGE VILLA.

BETWEEN the limits of the cottage class and that of the villa, there seems to be a medium which we will designate as COTTAGE VILLA. It has not the pretension of the one, nor the humbleness of the other.

To those who desire some of the ele-

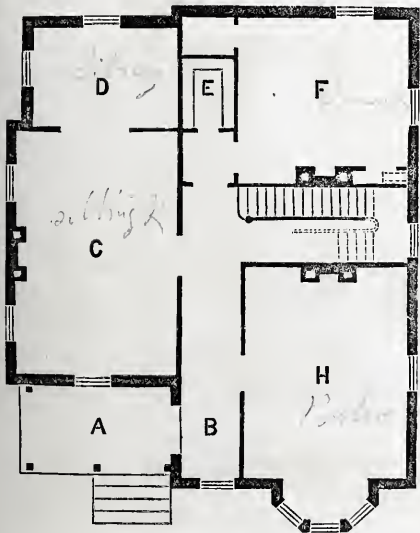
gance of life without ostentation, this form of residence is admirably adapted. And as the well-to-do class of citizens is, and always will be, far larger than that of the very wealthy, it must be, of course, the more popular. This design consists of a basement, principal, second and attic stories.

The Basement is laid out as follows :



A, Dining-room. B, Larder. C, Hall-way. D, Kitchen. E, Pantry. F, Cellar and Washing-room. G, Covered area. H, Open area.

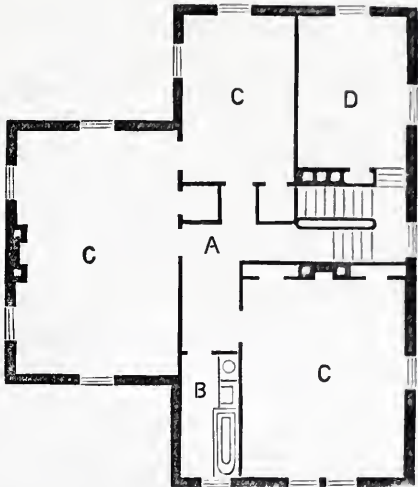
The Principal story is thus arranged :



A, Porch. B, Hall, with staircase at end. C, Drawing-room, with Extension-room D, connected by sliding doors. E, China pantry. F, Breakfast parlor, with pantry and closet. H, the Family parlor, with bay window.

The Second story, or Chamber plan, consists of: A, Hall-way and stair-

landing. B, Bath-room and Water-closet. C, C, C, Chambers. D, Servants'



sleeping-room, reached from the half-landing. Every room on this floor is provided with closets.

THE BOIS DE BOULOGNE.

PORTE ST. JAMES.

THIS unique little composition forms the gate lodge at the entrance called *Porte St. James*.

The boundary-wall and its gate are retired from the main road-way, and this little building is on the outside and close up to the wall. The space between the main road-way and the entrance to the Bois de Boulogne being laid out with tasteful elegance, and kept in scrupulous order.

The gate is placed a few steps above the approach. It is simple in design, and detracts nothing from the *recherche* lodge now under consideration.

The material of which this lodge is built is brick, in two tints, each in four courses, presenting a very pretty effect. The hoods over windows and doors are of cut stone, as are the trimmings generally. The imperial crest is set in the centre, between door and window. The covering of roof is well executed in colors, and the combing highly finished in open iron-work, with standard finials.

The economy of the plan is worthy of notice. A partition divides the whole into two apartments, the second of which is partitioned off into bed room with bed recess, (into which the bed is folded by day, thus admitting the more general use of the room,) water-closet and wash-room.

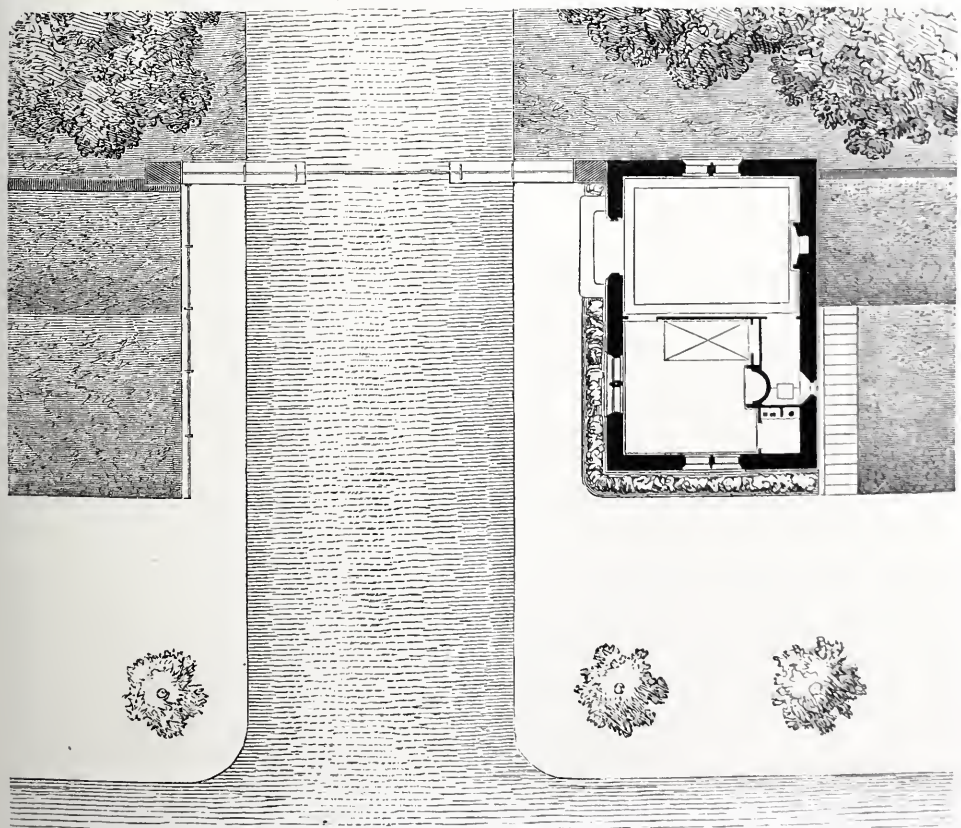
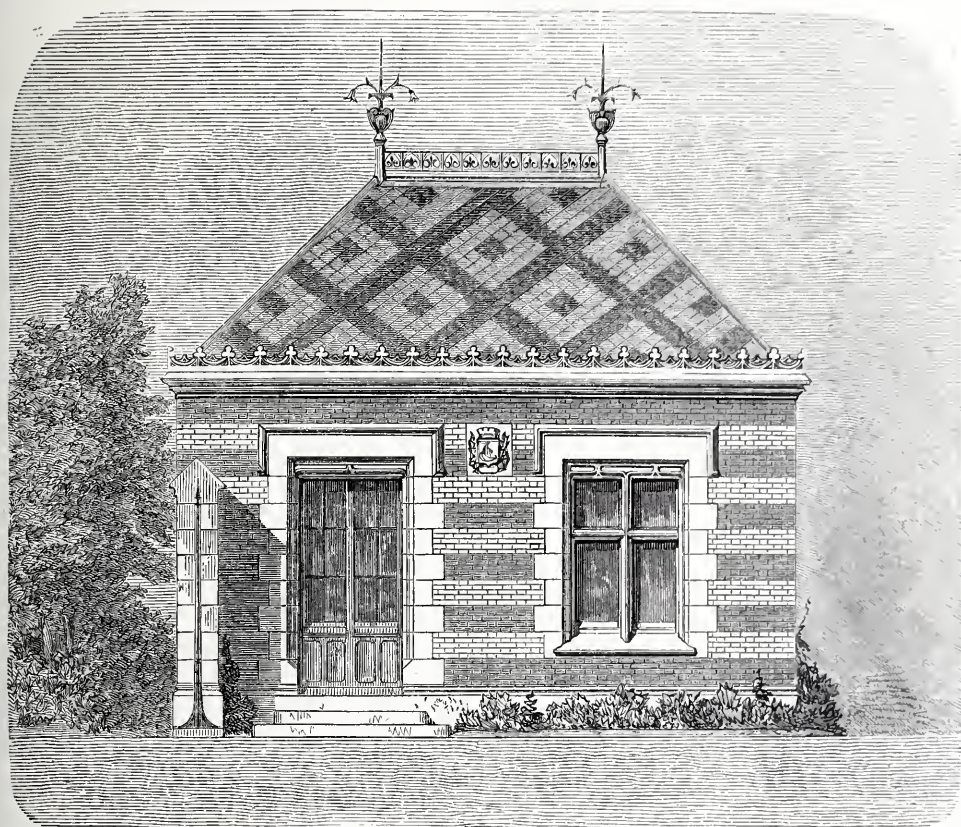
larly up to the first outshoots. This covering is surmounted by a cup or dish, pereolated in the bottom and filled occasionally with water. The constantly descending moisture thus conveyed to the roots by the matting of straw laid around the trunk of the tree at the surface of the ground, is not alone benefi-



It is surrounded with flower plats, and a flight of steps in the rear of it leads to the top of the grassy bank against which it seems to nestle.

We here see one of the walks in the Bois de Boulogne, with the trees shown as girdled round with straw, laced regu-

cial to its growth, but answers another purpose, namely, that of facilitating the withdrawal of the tree from the soil and transplanting it, for which purpose a peculiar form of carriage is used, by which the tree drawn up by the roots is carefully conveyed to its new loca-



LODGE, PORTE ST. JAMES, BOIS DE BOULOGNE

tion, and so carefully is this nice operation performed, that the most delicate fibre is unhurt.

We will continue to notice the gems of information so artistically conveyed in the superb publication, *LES PROMENADES DE LA VILLA DE PARIS*, and we are pleased to find that the enquiries after the work are so general. We are advised by the editor, M. Rothschild, that the part containing the boulevards is now in press, and we hope soon to be able to treat our readers to a specimen of the street architecture therein displayed, the pride and glory of the new-born Paris.

THE NEW YORK COLORED ORPHAN ASYLUM.

THE illustration here presented is that of a commodious, healthful and very convenient building, designed and superintended by *CARL PFEIFFER, Esq., Architect.* Of which the following is a description.

The Colored Orphan Asylum is located in New York City, and replaces the old asylum which was burned down by the mob during the riot of 1863. It is built in the German or Rhenish style. Only about two-thirds of the proposed building has been erected. When finished it will present a front of two hundred and thirty-four feet, by a depth of one hundred and twenty-five feet at the ends. It is three stories high, and has a basement and under cellar. The third story is formed by a Mansard roof.

The cellar is eight feet, basement ten feet six inches, the first story fifteen feet, the second and third fourteen feet high. The floor of the basement is three feet below the surface of the ground.

The outline of the ground plan, approaches in form that of the block letter **I**. The ends contain the principal dormitories, the general dining rooms, play rooms, and one large school and

assembly room. This room is about thirty-eight by one hundred feet and has a class room adjoining. The pleasing feature of this room as well as the dormitories and the general dining room is, that they are free from columns, and supports of the beams above through the space between the walls is about thirty-eight or forty feet.

The centre or main stem of the plan is longitudinally divided by a hall of twelve feet in width, and transversely by a hall eighteen feet wide, this contains the main stairway, which is very spacious (about seven feet wide) and of easy ascent, and directly opposite the main entrance. On the side of main entrance on the first floor are situated the offices, committee and class-rooms. The upper stories of the centre part are divided into matrons' and teachers' rooms, sewing, linen, and clothes rooms. Bath and wash rooms are adjoining all the dormitories, and separate bath rooms arranged for the officers, teachers and servants. The kitchen, bakery and storeroom are in the basement, also the dining, play and wash rooms. The kitchen is fitted up in the most approved manner and with everything required in a first class hotel; also the laundry. Every modern improvement to save labor, and make the inmates comfortable, has been brought into requisition.

Adjoining the large school room is a veranda to which the children can resort during the short intermissions for an airing, the top of the veranda being on a level with a large dormitory affords a balcony for walking, and for the airing of bedding. Each of the end wings has in the centre what appears to be from the outside an octagon tower, which forms a feature of ornament though it was designed for a practical purpose, as it forms a large bay on the inside of the large school room, and dormitories, and by opening the windows of the side angles, produces an efficient ventilation without producing an objectionable draught upon the inmates

At each end of the building where the wings join the main stem of the building and near the doors of the dormitories and school rooms is a fire-proof stairway from cellar to upper story, with iron doors to the adjoining rooms, and that in case of fire, only a wing could burn down leaving the centre part standing, (or vice versa,) and the inmates could thus escape without being in danger. The entrance is distinguished by a tower-like projection, in the roof of which is an iron tank, that contains between eight and nine thousand gallons of water, from which the water is distributed all over the building. And as a further precaution against fire, large pipes are distributed all over the building in convenient places in each story with large fire-engine hose.

Bells and speaking tubes are in abundance all over the building and connect all the rooms with the office and engine room, and in case of fire, alarm could be given in almost an instant to all the rooms from the office.

The closets, clothes and sewing rooms are fitted up with shelves, drawers, clothes presses and pigeon holes. The pigeon holes are large enough to hold the clothes of one inmate, and are all numbered.

In the basement are separate wash-rooms for boys and girls, each room about twenty by sixty feet. At one end of the room is a water tank about ten feet in diameter, and two feet six inches high, around which the children stand to wash themselves as they are called up from their benches in sections; each child has its regular seat and towel, comb and brush affixed to the bench.

The laundry, boiler, and engine-room are in a separate out-building, but connected with the main building.

To economize labor as much as possible, dust flues have been built into the walls of all the rooms; the dust, etc., is swept into these, and falls into a box in the cellar, from whence it is taken

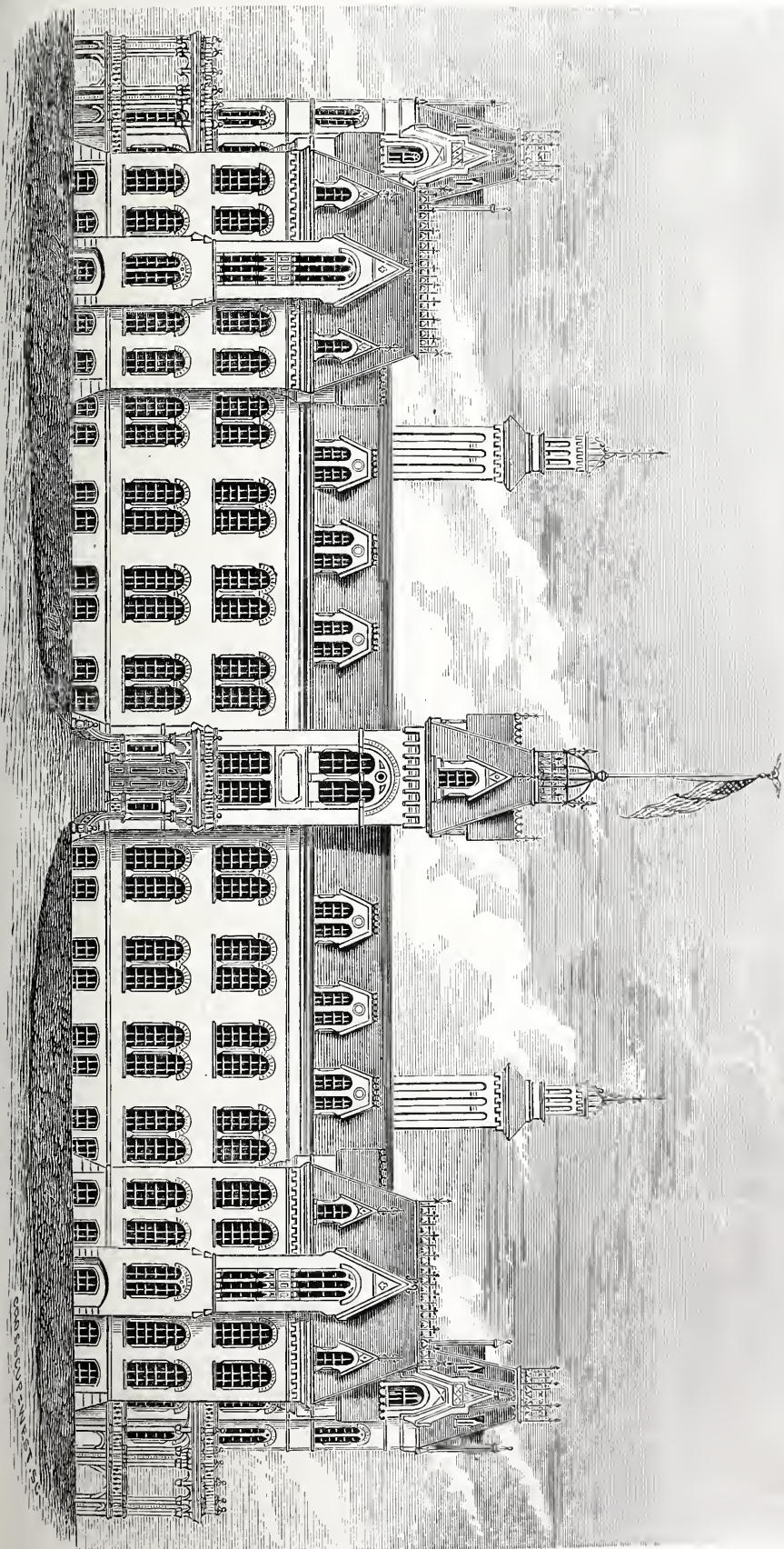
and burnt under the boilers in the engine-room.

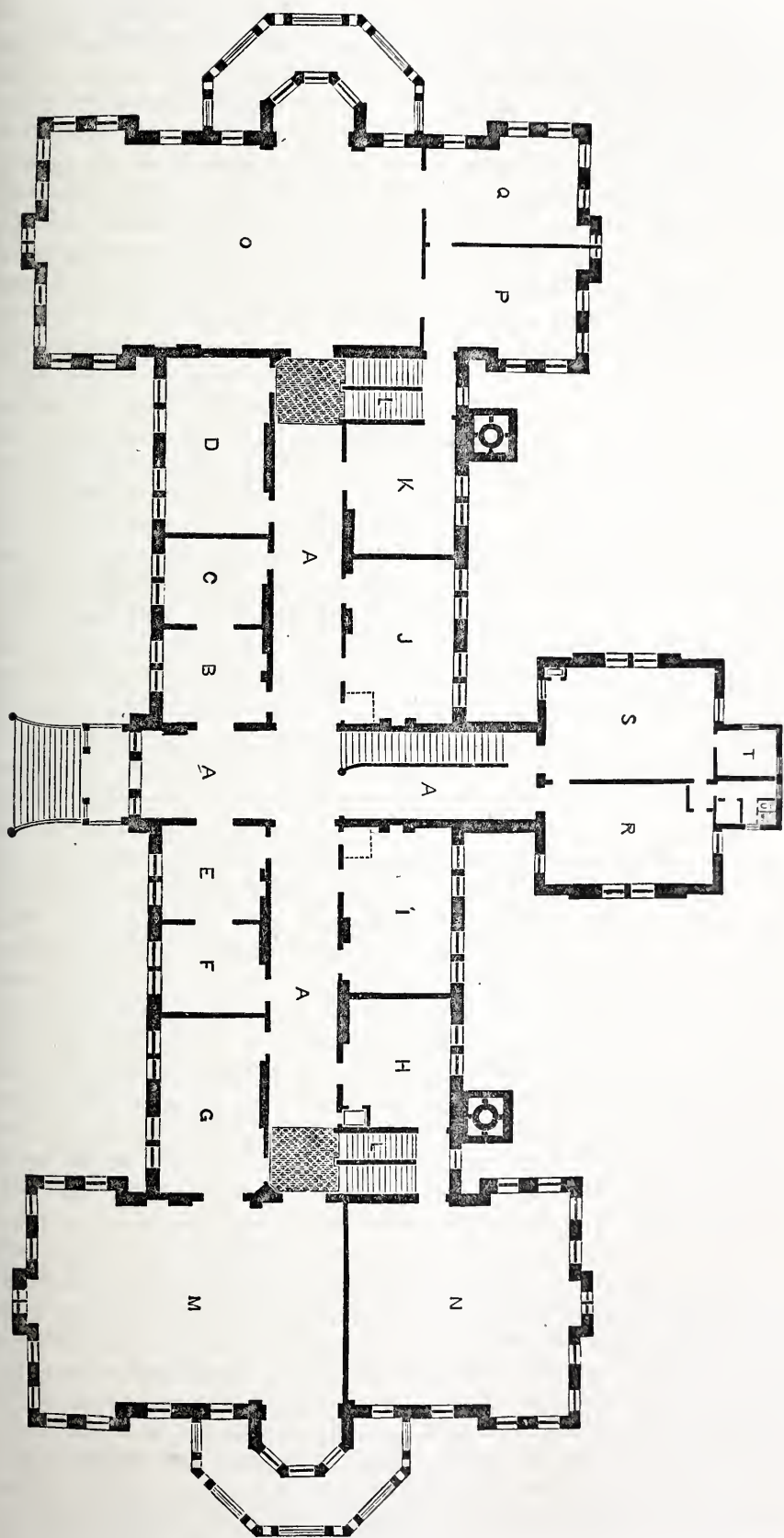
The building is put up in a very economical way. The exterior is of ordinary brick, but an effect of ornament is produced by artistic projections, recesses, and outlines also, by using different colored mortar. The interior woodwork is of yellow pine, and is not painted, but oiled, and retains its natural color. To procure good ventilation, the stories are very high, the halls and stairs wide, also the sashes and doors.

All the doors have wide revolving fanlights over them, quite close to the ceilings, and if kept open in all the rooms a uniform atmosphere can be maintained throughout the entire building. The windows are made as large as the wall spaces would permit, to introduce as much sunlight as possible.

The entrance doors of the dormitories are eight feet wide by twelve feet high, and as they are at the end of a twelve feet wide hall, and opposite two large triple windows of the interior wall, a sufficiency of fresh air can readily be introduced; besides, several of the windows of the dormitories extend from floor to ceiling, and not only are the rooms ventilated, but also the closets, and pantries are provided with fresh air supply flues, and foul air exit flues. All the drain and water-closet pipes are connected with the large boiler-house chimney, to extract the foul air, which works so forcibly that if a burning paper is held over the seat of the water-closet the smoke is drawn into it. As a further precaution to keep the water-closets clean, a spring chair is attached to the door of the closet and connected with a valve of the water-tank, so that when the door opens it pulls open the valve and flushes the soil pipe with water, consequently the soil pipe is flushed when one enters, and again when he leaves the closet. But not only was every precaution taken for natural ventilation, but also artificial is introduced without any additional cost,

COLORED ORPHAN ASYLUM, NEW YORK. CARL PFEIFFER, ARCHITECT.





ENT ROOFING is in the very great strength given to it by the corrugation of the plates and the filling of their concave ribs with plaster; thus stiffening them as well as rendering them fire-proof.

The form of the sockets is also well calculated, by its fitting the corrugated plates, to completely prevent any accident from lateral distension.

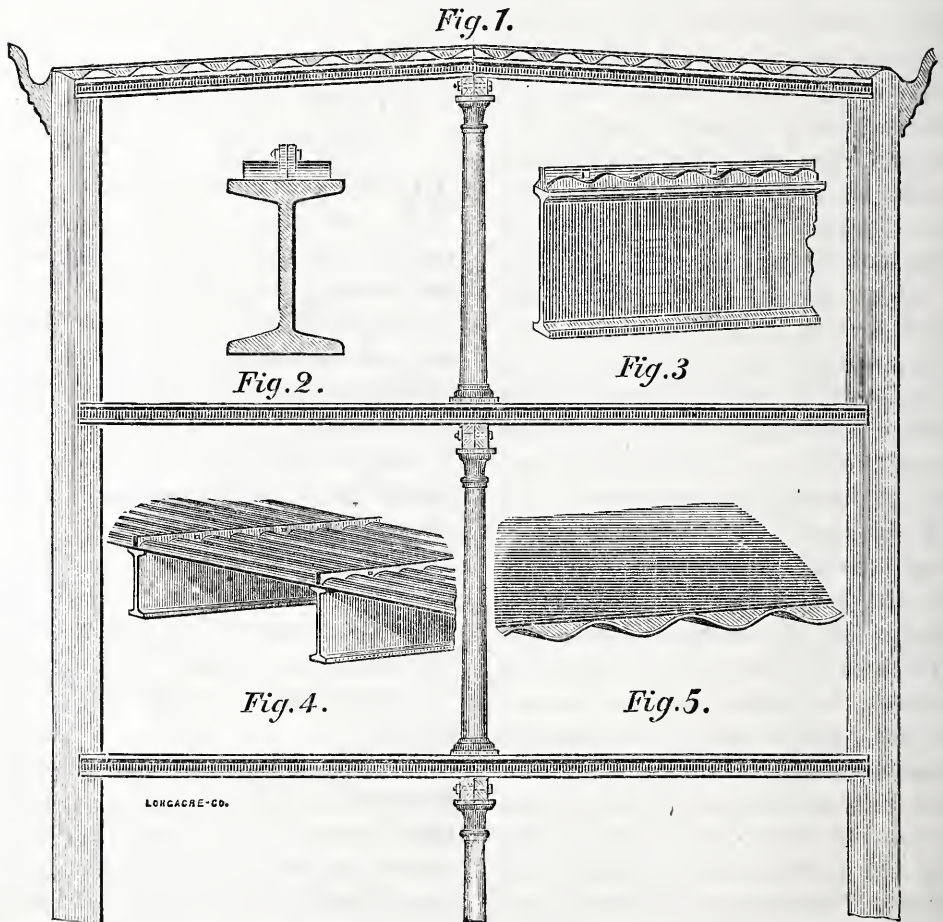
Viewed in the light of tasteful construction GILBERT'S PATENT ROOF AND CEILING have evident claims, especially

Figure 3 is a longitudinal view of an I girder and section of corrugated plates, showing how they abut against the sockets.

Figure 4 is a view of the corrugated plates in place on the girders.

Figure 5 is a view of the roof finished with the coat of plastic slate on.

It will be seen that this roof occupies but little room, and takes but little material when compared with the cumbersome truss roof, and as the plaster which



the former, which is vastly superior in appearance to the usual plan of slated roof, being far more ornamental.

Figure 1 of the engraving represents the transverse section of a roof and floor, showing the I girders in their length, supported at the middle by trusses and columns.

Figure 2 shows a section of an I girder with its sockets on.

fills its corrugations is a non-conductor of heat, the action of the hottest suns of July or August cannot unduly affect it.

The patent for this mode of roofing is entirely distinct from that which belongs specially to ceilings; the latter being also Mr. Gilbert's.

Further particulars may be had by addressing J. Gilbert, 429 Walnut street, Philadelphia.

"STRIKES,"—THEIR CAUSE, EFFECT AND REMEDY.

BY F. H. WILLIAMS.

[In giving place to the following, from an esteemed contributor, we desire to say that the pages of the *Review* are freely open to any and to all who may wish to discuss this question of "strikes," now so prominent a subject throughout the Old World and the New. It is truly a question most intimately connected with the best interests of society, and may be said to lie at the very root of our great charter oak of liberty.]

PROBABLY no one industry is more likely to be crippled by the frequency of "strikes" and the interposition of Trades-Unions than is that branch of enterprise which manifests itself in the erection of houses, and the extension of building operations upon a large scale. So many kinds of skilled labor are requisite in the construction of an edifice, and these branches are so mutually dependent, having a collateral relationship to each other, quite as important to success as is the relationship of each branch to the whole work, that a "strike" in any of the most common departments of skilled labor must, if persisted in, directly affect the cost of the building of houses, and be reflected either in the increased price of real estate or the falling off of building improvements, or both.

In view of these facts, it seems to us that a Periodical devoted to the extension of architectural works and the developement of architectural taste, is a peculiarly fitting medium for the expression of individual opinion upon this highly important subject. We, therefore, propose in the present paper to make an examination of it, carefully, and we hope impartially; for it is a theme upon which any criticism which is not impartial is far worse than no criticism at all.

We think this subject of "strikes"

naturally divides itself into three heads, viz.: their Cause, their Effect, and their Remedy. We had almost placed an interrogation mark after the last named, inasmuch as so many remedies have been proposed, tried, and failed, and the subject has been so thoroughly canvassed by deep thinkers, that the propriety of further propositions seems dubious. Nevertheless, we shall follow out this natural division of the subject, and begin by considering

THEIR CAUSE,

first of all, for a definition. We look in vain for a satisfactory one. Custom formally sanctioned the use of the word "strike" as designating the preconcerted and unanimous refusal of a certain body of men to proceed with a certain unfinished work, unless they received a certain advance in wages.

At present the term is inadequate, for it extends and applies to a much larger body of men or Trades-Union, which not only demands more pay but prohibits others—outside of the organization—from working at the low rates. For an argument of this kind we fancy that "knock-down" would be a better name than "strike."

But passing by these reflections and coming back to the matter in hand, what is their cause? It is the same old story, the struggle of muscle against money, of force against force, aided by the jealousy of, (we wish we had a better word,) caste. The subject is a delicate one, because it involves the consideration of the rights and privileges of two entirely distinct classes, and hinges upon the much vexed question of the relative functions and powers of Capital and Labor. In a republican community, this question brings into contact the two classes which are naturally the far-

thrust apart, the man of means—the generating source which *supplies*, and the working-man—the executive force which *constructs*. All agree that these powers are dependent upon each other, and that therefore they should be harmonious and co-ordinate, and we think this acknowledgment warrants the exceedingly bold assertion that “strikes” are positively wrong in principle, even though temporarily successful in practice.

It is vain to deny that the disposition of the laboring man to make increased demands is fostered by a certain feeling of antagonism which seems inherent. To his view, fortune, chance—the term of the die of fate—has placed a great gulf between him and the capitalist, in whose interest he is expected to work.

He sees the man of wealth leading, to all appearances, a life of enjoyment—certainly one of luxury; he sees that man of wealth lying back in his carriage, and rolling past him on the highway, common to both; he knows full well that one dish on that man’s table is worth a day’s wages to *him*. Yet is not one as good a man and true as the other? Are they not equally honest, equally worthy, perhaps equally intelligent? Are they not both American citizens? The workman has at home a wife and children, whom he loves with as much tenderness as the capitalist is capable of feeling, yet that wife’s hands are hard with work, and the children have to leave school prematurely to assist in maintaining the home. Such thoughts will arise in the breast of such a man, and say what we will, whether we view the facts from one standpoint or another, it is human nature that they should.

We do not blame human nature, although we believe this manifestation of it arises from a want of proper reflection. While one man is envying another man his wealth, the latter is envying the first his health. As a rule the man who labors to get up an appe-

tite for his food is less happy than he who labors to get food for his appetite. There is an inevitable, unalterable law of compensation, which is as fixed as the eternal source from which it springs. It is not intended that any one human being should inherit all the good things of this world, and escape all the bitter; nor is it intended that any human being should be weighed down with misfortune without any compensatory and alleviating circumstances. “The laborer is worthy of his hire,” and here we have the key-note—he is worthy of his hire, just as the bonds held by the capitalist are worth their market price—but he is not worthy of one cent more; neither are the bonds. The wealth of the rich man is invested in his bonds; the wealth of the poor man is invested in his muscle. The former must submit to the price dictated by the inevitable laws of supply and demand; can the latter do less?

The strikers endeavor to set aside the ordinary rules of trade and effect their purposes by combination. The Trades-Unions limit the supply of apprentices, and make arbitrary regulations without any reference to the merits of the cases under consideration, and without any rational attempt to study cause and effect. Their determination to be arbitrary further crops out in their calling in the aid of legislation to assist them in their crusade against the natural order of things. A law is passed, declaring eight hours to constitute a day’s work, and yet this law makes no provision for the altered value of that day’s work. The supposition therefore is that eight hours are worth as much as ten hours.

True it is that reason and common sense rebel against such a supposition; but Congress says “It is so,” and as Congress is composed of legal representatives, elected by a free constituency, we must choke down reason and echo, “It is so!” Suppose Congress were to see proper to pass a law that eighty cents should be legal tender for a dollar’s worth of goods, and yet refuse

to alter our decimal money table, we could then buy a dollar's worth of a commodity and have the option of paying for it either in eighty one cent pieces, sixteen five cent pieces, eight ten cent notes, or a *one dollar note*. Which would we be most likely to do? Surely not the last; we would save our dollar notes, and within twenty-four hours from the passage of the law the brokers would be advertising dollar notes for sale at twenty-five per cent. premium.

And further, suppose that an advocate of the eight hour law were to contract to do a certain job for a party for \$1000, and that party, taking advantage of the supposed eighty cent law, were to tender him \$800, at the completion of the work, in payment, would the mechanic complain? On what principle of right or justice could he?

The Trades-Unions have succeeded in making Congress virtually declare that eight times one are ten, and that four-fifths make a whole, but Congress is as impotent in this matter as though it sat at Washington and commanded the sun to stop shining.

No system can stand which is antagonistic to the teachings of common sense, and contradictory of the multiplication table.

But again, we find a cause for the prevalence of "strikes" in the immediate juxtaposition of labor and capital which is necessary to all operations. Independent of any of that feeling of jealousy which we have alluded to, and supposing the representatives of the two classes to be equal in every respect—socially, mentally, commercially—there is still so close a contest of interests that disagreement is nearly unavoidable. There is here no medium through which the differences can be modified and toned down to meet each other, and through whose influence they can be adjusted, no central power to soften the point of immediate contact; the two forces meet face to face, and settle their terms in a personal struggle. The friction of any

two substances must evolve heat, and in the case of labor and capital the feeling or sentiment produced finds an occasional vent in a "strike."

Another cause for these refusals to work is to be found in the conduct of certain men who, by their tact, become leaders among their associates, and then use their influence for their personal aggrandisement and gain. This fact has received its most forcible illustrations in the coal regions, where "strikes" have, of late, been of such frequent occurrence.

We do not believe that the majority of miners want to strike; we do not believe that one man in ten could be found to join a "strike" if he could be made fully to understand its workings, and appreciate its inevitable tendency and results. An *army* of honest men is led into error by the specious vituperation of a few. Thousands are made unwillingly to take the bread from their families' mouths that these few deceivers may fatten upon their credulity.

This is the worst kind of demagogism and is worthy the strongest condemnation of every intelligent American mechanic, although to reach an immediate remedy seems to be a somewhat difficult task.

Again, we have repeated instances where the members of a certain union have struck because their employers have given work to other mechanics not members of any union. Here there is no dissatisfaction with the amount of wages, and no demands made for an increase. It is simply the carrying out of an arbitrary policy to force all mechanics into the unions, in order to enable them to overturn mercantile calculations, and veto the law of supply and demand. Thus honest men and good workmen, who have sense enough to maintain their independence and keep out of the unions, are compelled to yield their principles, or be driven without resource, from their sphere of usefulness. Does not such action savor strongly of mob law?

The fact is, monopolies are always

dangerous—dangerous alike to themselves and to the community at large—and a persistent effort to establish or maintain them can hardly fail to have an effect adverse to the public good.

In addition to the causes of "strikes" above enumerated, there are doubtless many others which exert a large influence, and an examination of which might be profitable, did time and space permit, but we pass them by now, in order to reach the more important questions involved in the consideration of

THEIR EFFECT.

Any theory which proposes to regulate, either by legislation or combination, a commodity, subject to the laws of supply and demand, is false; any theory which proposes to go still farther, and, in addition to withholding the commodity from market, to prevent its future production, is criminal. That labor is such a commodity is a fact patent to all; the labor market fluctuates, and is as much subject to the stiffening influences of a brisk demand or the depressing effect of a stagnation in trade, as are the flour, the coal or the money markets.

We often hear a cry of indignation—a just indignation—from the mechanic or the laboring man, when the grain speculators, by a concerted effort, lock up the supply to such an extent as to produce a sudden and inordinate rise in the price of flour, thus placing the very staff of life beyond the reach of the poor man. Such practices are stigmatized as "gambling in the necessities of life," "robbing the mouths of the poor," etc., etc.; but what would the mechanic or laboring man say, if the speculators, by the power of their capital, were not only to lock up the present marketable supply, but endeavor to stop, to as great an extent as possible, the planting of the seed, thus striking at the very root of production, and ensuring a future famine? Such action would be not only impolitic but wicked in the extreme. Yet this is precisely what many Trades-Unions are

attempting to-day; they not only forbid their own members to work for less than certain designated rates, but prescribe the number of apprentices (a very *limited* number) which a master mechanic may educate in his shop, thus rendering certain a calamitous scarcity of skilled labor to supply the demands of an increasing population.

It may be objected to this comparison that there is a wide difference between bread and labor, but we contend that a blow aimed so directly at those industrial interests, upon which the prosperity and life of the whole community rests, is as disastrous in its consequences, and as criminal in itself, as the famines causing grain speculations.

Moreover, this limiting of the number of apprentices, forces young men of energy and ability into some of the already over-crowded "professions," for which, perhaps, they have neither taste nor talent, and in which their practical value to society is wasted and lost; or, perhaps,—what is far worse,—these young men—meeting with no response to their petition for that education necessary to direct their labors,—fall into habits of idleness and vice, and become nuisances to that community they might have adorned.

This is no fancy sketch; it is not even a probable hypothesis, but an actual well-known fact, illustrated in every day's experience; and is but another proof of the adage, heretofore quoted, that "monopolies are dangerous"

The whole commercial system is but a system of barter,—of exchange of one commodity for another, money being merely a medium used for the sake of convenience. Now, it is a well-known fact, that no one prominent market article can be materially altered in value without disturbing the condition of other articles. If the price of one thing, by any unnatural process, be forced up to a point far beyond its intrinsic worth, other things will advance in sympathy. That is to say, money—the medium of

exchange—cheapens in proportion as a prominent commodity becomes dearer, and therefore it takes more money to purchase any commodity on the market.

Now, if I am a mechanic, and by the united action of myself and colleagues, force the market value of my labor beyond its proper mark, does not my action reflect back upon me, in the increased price I have to pay for my coal, my tea, coffee, sugar, clothing, &c.? I barter with the community, my one commodity—labor, for its hundred commodities,—the articles which I require in living. If I arbitrarily place a premium of 100 per cent. on my labor, I will have to pay a premium of 100 per cent. on that which the community gives me in exchange.

This view is perhaps even too favorable, for it is found that where one article rises in sympathy with another, the article so sympathizing receives an impetus that drives it beyond its proportionate advance. We believe that the majority of those who engage in "strikes" will be disposed to acknowledge the truth of this argument,—at least to a certain extent. We think they will agree that all marketable articles, subject to fluctuation will sympathize, even though they may not go to the entire length of our assertions. Yet there is an *immediate* prospect of gain in an increase of wages, which outshines in their eyes the permanent benefits made manifest by a thoughtful examination of the other side of the subject; and it is this gilded apple which lures them away from the paths indicated by reason.

We wonder whether those who have stood out on a protracted "strike," ever went into a calculation—first, of their actual loss in wages during the time they were idle; second, of their loss in interest on the same; third, of their loss by the diminution of their savings, by the amount required in living, (for men must have their bread and butter, come what will); fourth, of their loss by the acquirement of habits of idleness,

which inevitably lead to habits of vice; fifth, of their loss as individual members of a community which they have impoverished by the exact amount of their production during a period of equal duration with the "strike;" and sixth, of their loss in the sympathies and esteem of their employers,—a loss which must be keenly appreciated when the tide turns, and puts the power to dictate terms into their (the employers') hands.

If a mechanic earning \$3 per day, strikes for \$3.50, and remains out thirty days, he loses in wages \$90.

If, at the end of that time, he obtains his demand—which is not likely, a compromise being more probable—it will take him one hundred and eighty days to make up his actual loss, to say nothing of interest, and the moral declension in his character; and there are nine chances out of ten, that before these one hundred and eighty days roll around, circumstances will give his employer an opportunity to dispense with his services,—an opportunity not likely to be neglected. He is thus thrown out of employment, with nothing to fall back upon but his good character as a man, and his ability as a workman; the former of which is damaged by his "striking" proclivities, and the latter by his having been so summarily discharged from his last place.

If a Trades-Union undertakes to back up a "strike," by furnishing support to the families of the strikers, it merely becomes a medium for a re-distribution of the earnings of previous industry, and as the assessments would probably be made upon the members in proportion to their ability to contribute, the bulk of the burden would have to be borne by those who have been the most frugal and industrious in the past, and are therefore most worthy of support and encouragement in the present.

Look at it as we will, we cannot find any *permanent* results of "strikes" that are not bad. The immediate benefits that sometimes ensue are only tempo-

rary, and always lead to a reaction, while the moral effect upon all connected with them is greatly to be deplored.

THEIR REMEDY.

Many persons will regard that portion of the subject which properly comes under this heading, as the only portion of any practical importance to-day. We admit that it is of more vital moment that a remedy should be found for the condition of chronic warfare into which labor and capital seem to have fallen, than that we should enter into a disquisition upon cause or effect. A consideration of causes and effects, however, may be instructive; an examination of remedies can only be suggestive. We are grappling with a great problem, and one whose importance lifts it above the necessity of fine details in its solution. Details can be attended to at a more convenient season; just now the problem confronts us boldly, and must be boldly met. Half-way measures are worse than nothing. The great contending forces, capital and labor, must first be brought into a relation with each other, which will admit of the adjustment of a basis satisfactory to both. Until this is done, we may theorize, and propose, and suggest without avail. As the case at present stands, their fundamental principles are utterly incongruous, and so long as they remain so, permanent harmony of action is impossible. This, then, is our task; the first grand step towards the accomplishment of which is, we submit, to positively abolish all Trades-Unions, as at present constituted. This is a sweeping assertion, but it is not made without full reflection, and a consideration of the possibilities involved.

These Trades-Unions have generally been the sources of those discords and disagreements which have resulted so disastrously in the past; and have utterly failed to render any sufficient compensation to balance their evil effects.

When we call them *Protective Associations*, we are guilty of the use of a gross misnomer. Where are they protective? Whom do they protect? Certainly not the poor workingmen whom they drive from the fields of honest labor; certainly not their own members whom they deliberately lead into error, and over whom they exercise an authority so offensively dictatorial that no American citizen of proper self-respect ought to submit to it; certainly not the community which they impoverish; certainly not commerce which they cripple; certainly not the cause of internal improvement which they injure; certainly not the capitalist against whom their shafts are so specially and senselessly aimed. Whom then? We ask for a response and will be thankful for any correction if our views are false. In the meantime we call for the abolition of these Trades-Unions on other grounds. They are so easily capable of becoming nests of corruption, that it is nearly impossible that their administration should be conducted upon principles of honesty, and in accordance with the best interests of their members. There are never wanting, men shrewd enough and bad enough to climb to power over the distorted ideas of others; men who are ever ready to inflame prejudice and excite passion in order that they may reach such a position of leadership as will secure to them the desires of their ambition and their greed. Unfortunately, the Unions are composed of just the right material for such demagogues to work upon. The members are men possessed of sufficient education to be dangerous to themselves, but of not enough to grasp the great principles of political economy upon which the social system rests. American mechanics, as a class, are not illiterate men: far from it; if they were, it would even afford less opportunity for these false leaders; but they are men whose station in life has debarred them from the best opportunities of education, who have gained

their knowledge in snatches, "between hours," and whose ideas, though *seeking* the truth, are necessarily crude and unstable. It must be understood however that we acknowledge many exceptions, referring here to the *masses* of the class of which we speak. If these ideas are correct we hold that the Unions must soon become prostituted to the uses of personal aggrandizement, and are therefore unworthy of support.

Again, they tend to the formation of monopolies, and are therefore dangerous, *per force*, in theory as well as practice. In officiously interfering with the laws of supplies and demand, they strike at the root of an equalizing and moderating mercantile influence, without whose existence all our financial, commercial, monetary, and industrial systems would be involved in hopeless chaos and confusion. Again, as already remarked, they rob the more worthy of their members and give to the more shiftless, thereby countenancing within themselves a sort of agrarianism. A system subversive of good order, and hostile to every principle of law and equity.

In view of these facts, we say, abolish the Trades-Unions as the first great stride towards a solution of the labor problem. There can be no objection to the formation of *Protective Associations*, if their object and scope correspond with their title, that is, if they are merely Insurance Companies for the protection of those members who have encountered misfortune, but when they go further than this, they are without their sphere, and worse than useless.

The next step towards solution is the adoption, as far as practicable, of the system of working by the job instead of by the day. It brings the mechanic up to a level with his employer in all respects essential to the equality of manhood. The man who knows that the amount of money earned depends entirely upon the amount of force expended, and that that amount of money

is only limited by his own capability and endurance, has a stimulus to action which cannot be appreciated by him who plods a daily routine for an invariable sum. There is a vast difference between him who looks forward to the successful completion of a work, and him who looks forward to the arrival of six o'clock. The one thinks of things accomplished; the other dreams of time annihilated; the one is a *man* with a man's heart in his work; the other a *machine*; his aspirations checked; his capabilities fettered. By so much as a man *feels* his manhood does he become fitted for higher spheres of action; the more he leans upon himself, the more able is he to support himself, and thus he daily becomes more independent, better educated, freer from prejudices. As his prejudices vanish, the gulf between the representatives of labor and capital narrows. As his knowledge of men and things increases, he comprehends the true relative position of these forces, and the mutually dependent relation they bear towards each other. Petty jealousies cannot exist in the broad light of his thorough understanding. He looks with pity upon those who are hoodwinked into believing in the expediency of "strikes," Trades-Unions and "labor committees." *That man has solved the problem.*

It is true that there are certain kinds of work which can only be paid for upon the basis of *time*, but in such cases the *hour* should be adopted as the unit, instead of the day. This plan would at all events hold good until Congress declared that forty-eight minutes made an hour. When that occurred we should have to checkmate Congress by skipping to the shortest recognized measure of time, and adopting the *second* as our unit.

That the carrying out of these suggestions would go far towards preventing a recurrence of "strikes," is at least partially proven by our past experience. We have occasionally had limited de-

monstrations of these theories, which, although isolated instances, have been sufficient to show what further progress in the same direction would accomplish. There are, however, other reforms needed before we can hope to see an harmonious co-operation. One of these is the establishment of that system which makes the mechanic a householder, thus giving him the independent feeling of having a home of his own, and making him directly interested in the community of which he thus becomes an integral part.

The individual who has a money interest in the society in which he lives, loses a certain amount of individuality in that society, just as a partner loses his, in the firm of which he is a member. But the individual is surely a gainer by this loss, for his interest is centred upon issues of far greater scope, and he necessarily becomes less selfish, more liberal minded, and a better citizen. In elevating himself, he elevates others. That which improves his condition, benefits the community as a whole; that which does the latter a service enures to his advantage as one of its component parts. Every year weaves the destinies of the man more closely into those of the people. The man who has this desire for the community's welfare at heart will not encourage that which interferes with its material growth and prosperity. His face will ever be set against all lawlessness and injudicious action, and out of the original sentiment of self-interest will be engendered the nobler one philanthropy.

It may be said that it is no easy matter to place the laboring classes in so desirable a situation. Perhaps not; but we think it will be found more easily practicable than is at first supposed. To a great extent, the experiment has been tried in Philadelphia. No city in the world affords so many home comforts, and such cheap independence to its mechanics and laboring men, and in no city do we find as many educated

minds among these classes. The idea of cheap, small and comfortable houses, where each poor man can sit at his own hearthstone and be lord of his own castle, is no chimera. With the aid of building associations, (excellent institutions, *if honestly managed*,) men without means can have their own homes, with the certainty of ultimate sole ownership, if they persevere in industry; and this ambition becomes their great incentive to action and guarantee of success. This system tends to social equalization, and therefore diminishes the chances of conflict of interests, which is the point we wish to reach; for that there must be *different* interests, is certain.

Any agency for the accomplishment of a purpose must consist of at least two parts: a motive power and an executive force. The first propels, the second performs; the first commands, the second obeys; the first vitalizes, the second gives direction to the vitality. Harmony must exist between the parts, or the agency becomes useless. If the second power refuses to perform, obey, or give direction to the efforts of the first, or if the first fails to fulfil its duties to the second, action ceases, and the machine is at a dead lock. The steam-engine which gives life and power to a great mill or factory, is a beautiful illustration of harmonious action and its grand results. The steam is the soul—the vital principle; the piston-rods and wheels are the great obedient performers. Every screw and bolt is indispensable to the motion of the shafting. Take away the steam, and the engine is a mass of dead, cold, useless iron; take away the machinery, and the steam is but idle vapor, blown by the breath, and less substantial than a cloud. The great social machine, upon which such vast issues are concentrated, and which depends for its successful operation upon the harmonious working of Capital and Labor, demands the most prompt and careful consideration. It is the machine which builds our cities, makes our rail-

roads, and mines our coal and iron. When its constituent parts are in accord, its power is nearly without limit. Give it but a fulcrum, and it would lift the world! Is it not deplorable that it should be so frequently out of joint? Yes, but how is Labor going to be induced *at all times* to perform and obey that which Capital directs and commands?

Simply by proving to the former that its interests are as deeply involved for good or evil in the results, as are those of the latter. What are the essentials to the establishment of such proof? First, Education—broad, thorough, liberal; second, a fair partnership for the mechanic in all his business connections with the capitalist. The mechanic must be lifted above the degrading system which assumes that a fixed amount of pay is equivalent to an optional and voluntary amount of work; he must be directly interested in the success of every venture in which he embarks; he must feel as pressing a necessity for the judicious investment of his brains and muscle as the capitalist feels in the investment of his dollars; he must perform with *vim*, and obey with alacrity.

We do not use the word "obey" in any sense denoting a degradation: we mean that he must obey the directions of capital just as the piston obeys the pressure of the steam—that is, as a thing necessary to harmonious action and to success; necessary to *mutual* interests, as a business matter and as a matter of course. The point of contact between the motive force and the agent for its utilization must be so finely adjusted that misunderstandings will be impossible. This can be done by sweeping away prejudice on the one hand, and by making an equitable division of gains on the other.

We leave the matter here; the views set forth are merely outlines, requiring an immense amount of filling in and elaboration to become practically useful. The arguments are only suggestive, and designed to elicit a free expression of opinion from those well versed in the principles of social government and political economy. Grave questions of finance, commerce, trade and internal progress, hang on the solution of the Labor problem.

Will not some philanthropist solve it?

THE HYDRAULIC RAM.

BY H. P. M. BIRKINBINE, C. E.

THERE is no apparatus used for raising water as simple and efficient as the Hydraulic Ram. A few years ago it was almost in universal use where but a small amount of water was required, as that for farm purposes. Later, however, wheels and pumps have been substituted in many cases, not that the water-wheel and pump are more efficient, less expensive or liable to get out of repair, for in all these particulars the ram has the advantage, its very simplicity and durability has been one of the means by

which its character has been injured. These apparently contradictory statements may be accounted for by the fact that rams have been constructed and put up by persons ignorant of the principles of their construction; for these reasons they are troublesome, or raise but a small percentage of the water.

Whenever the work is properly done by skilled men, the ram is set in operation and never looked at until some parts are worn out; or for some reason it ceases to operate. When a screw gets loose or some obstruction finds its way

into the pipes or valves the fact is never known until the supply of water fails. A wheel and pump being a much more complex apparatus requires mechanics of greater ability to construct and erect. Then it is necessary to inspect them at stated intervals, to oil and keep them in repair. Were but a tithe of this attention bestowed upon the rams they would never be substituted by any other apparatus. A ram in use for many years for supplying a coal brakery with water for the engines and mines has never been out of order. It was made the business of a mechanic to inspect it the first of each month: Extra valves were kept on hand so that the machine was always in good working order.

A ram properly constructed and fixed may be depended upon to give a co-sufficient of 70 per cent., that is but 30 per cent. of the power of the water is lost in its passage through pipes operating valves, etc.

This does not include the friction upon the conducting pipe leading the water from the ram, which will be in proportion to the length and the velocity of the water, no matter what apparatus be used to pump.

With 10 feet fall and 10 gallons of water per minute, a ram will raise 988 gallons per day 100 feet high; while a water-wheel and pump of the same capacity, working under the same head and fall, if of the best proportions and construction, would only raise 792 gallons per day.

Rams have been successfully operated with but 17 inches head and fall, raising the water 30 feet. They have been made to raise water over 200 feet high. They have been successfully made and operated as large as in six inch drain pipe.

Probably, therefore, the small rams have been the most successful where they are making with a head and fall of from 5 to 20 feet, raising water less than 100 feet high. The construction and erection of a ram requires but a small amount of skill; but where large machines are

required, or comparative small head and fall procurable, or where the height to which the water is to be raised is great, or where a high co-efficient is necessary or desirable, none but one skilled in such matters can make a successful apparatus.

PROPOSALS TO MAKE A NEW SEA.—The *London Standard* says: M. de Lesseps is not content with diverting the commerce of the world and carrying ships across an isthmus, he now contemplates a project for remodelling a continent and creating a new ocean. He has ascertained that the general level of the desert of Sahara is below that of the water in the Red Sea, and he is represented to be thinking of cutting a passage for it into the interior! There is something almost absurd in the idea of making a new sea, but next to the audacity of the project the most remarkable thing about it seems its wonderful simplicity. If only those figures ascertained by M. de Lesseps are true, what is to prevent the desert from becoming a vast lake of salt water? The surveyors sent to investigate the matter declare that the ground slopes down to an average level of twenty-seven metres below that of the adjacent gulf. Cut a canal through the intervening patch of high land, and what is to prevent the water from flowing in? It is becoming evident that M. de Lesseps is not a man to be trifled with, and we sincerely hope he will not find the British Islands anyhow in his way, or he might propose to dredge them off the map of Europe. If he disestablishes the desert of Sahara nothing will stop him afterwards, and we shall expect to see him undertaking to warm the North Pole, or getting up a company for supplying the nations of the world with inland lakes, rivers, forests, and all physical phenomena on the lowest terms. Mountains removed in town or country. Agencies in all parts of the solar system.

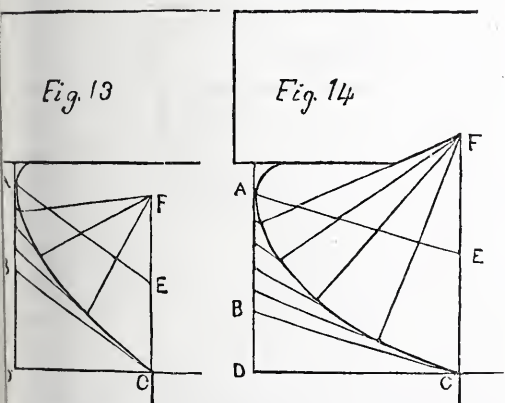
LESSONS FOR LEARNERS.

CONTINUING on our course, we will point out the remaining moldings which the pupil will have a necessity for a knowledge of, and which we trust our student friends will pay due attention to.

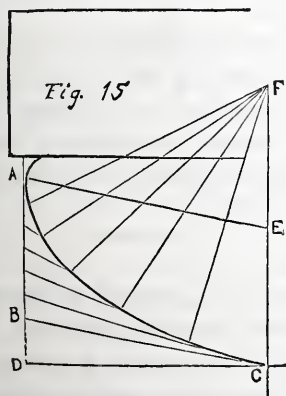
The following are classed as Grecian moldings, and in their contour are so different from the Roman that the methods of describing each must be distinct.

TO DESCRIBE THE ECHINUS.

This is the Ovolo of the Grecian style, and having various degrees of prominence, we give it in three forms. As seen in Figures 13, 14, 15.



Have two tangents to the curve, and the points of contact given, one of the points of contact being the greatest projection,

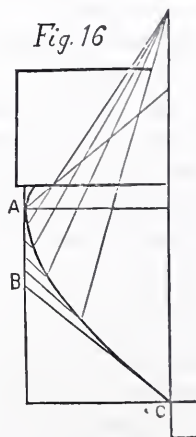


jection, and the other the lower extremity of the curve.

In Figures 13, 14 and 15, let A B, B C, be the two tangents, A the point of contact at the greatest projection, and C the lower extremity of the curve; draw A E, parallel to B C, and C E, to F, making E F, equal to E C; divide A E, and A B, each into the same number of equal parts; from the point F, draw lines through the points of division in A E, and also from the point C, draw lines to the points of the division in A B, to meet the other through the divisions of A E; through the intersections draw a curve, which will be the contour of the required ovolo.

The molding will, of course, be flatter or quicker according as the point B, the extremity of the tangent B C, is nearer or more remote from A, the greatest projection.

In Figure 13, B D, is one-half of A D; in Figure 14, B D, is one-third of A D; and in Figure 15 B D, is one-fourth of A D. Also the quick or recess at the top will be greater, as the distance is greater.



Draw A H, parallel to the fillets; produce the vertical line C H, to K, making H K, equal to H C, and H I equal to B D; join A I; divide A I, and A B, each into the same number of equal parts, and through the points of division in these lines, and through the

FALL HOUSE CLEANING.

BY HETTIE HAYFIELD.

IT is Washington Irving, I believe, who has associated inseparably, the charming month of May with house cleaning, by his graphic description of the bustling, busy turmoil of a day the good city of Gotham has dedicated from time immemorial to the deity of change—that being the general season when renters change homes. We do not know what are the necessities of the case in that latitude, but we have adopted the latest of our fine fall weather for our most general house cleaning; for, of course, spring will bring with it some necessary changes in bedding, curtains, carpets, and the putting of hearths and grates in summer order, when fires have become useless. Our reasons for adopting fall for this business are: First, that there is more leisure, and the long calm days render it more agreeable. Secondly, there is much pleasure in enjoying the fruits of your labor as long as possible. The pleasure of seeing everything around you pure, is greatly prolonged by adopting fall for such portions of house cleaning as whitewashing, painting, &c. In spring, you scarcely get through the job, before the flies and dust are making visible marks; but in winter, these annoyances have been laid to rest, and your eyes may look with satisfaction on the works of your hands all winter, and spring will find all as fresh as if newly done. Meanwhile, all painting, especially that exposed to the weather, lasts much longer when done in the fall, the oil not drying so quickly is not absorbed by the wood, but combines with the paint, and thus preserves it longer. We make an exception in favor of whitewashing in spring, i. e. out-buildings and fences. The driving rains of winter will wash it off, unless the very best preparation is used.

When you have house cleaning on hand and have not enough help to do it without interrupting the regular work of your family, it is well to make every arrangement so as to go it "with a will," as the sailors say. To save yourself from a waste of sympathy with the rueful feelings a man's visage always indicates on such times, persuade your husband off to the State Fair, detail your trustiest help to rule in the nursery, and, having baked and brewed as if a succession of Sabbaths were coming, wherein no kettle could sing, arm and equip your household with brooms, brushes, etc., and let the early dawn and dewy eve see the work of purification going on. "The harder the storm the sooner it is over," is a good saying then. Where there is a supernumerary in the family, who is competent and reliable, let her take a room at a time, leisurely, and you will never know the ludicrous trouble masculine humor has so revelled in depicting. Be sure that you have everything on hand that you need: soap, sand, brushes, tacks, paint, oil, glue, etc. It makes woeful waste of time to wait for a "messenger to town" for half a day. When ready, have your pictures, mantle ornaments, in short all easily moved articles, taken to a room to be cleaned; while the room itself is undergoing a similar process, covering over the articles necessarily left in the apartment. Clean out and arrange the closets. The carpets having been removed, sweep off the floors perfectly; then, with a long handled straw broom, sweep the ceilings clean and also the walls. If the ceiling is to be whitened, proceed with a whitewash brush (and the mixture in recipes appended,) by laying on one coat, making the strokes all the time in one direction; when dry lay on the second coat, crossing the first

all the time. This repeat until the desired color is had. If any spots drop on the paper, when dry rub them off with a stiff brush. Next proceed to clean the windows, then the wood work generally, with brushes and cloths. If the paint is white, mix a teacup of whiting in a pail of warm water and wash with it. If the paint is colored, soapsuds of hard soap, or water softened with sal soda, will have to be used. After the windows have been washed and are dry, rub the glass bright with soft papers. Whiting spread on glass and rubbed off after drying with a clean cloth, will make the glass clean. A mixture of whiskey and water will also clean glass. If the floors have no grease on them, they need but to be washed perfectly clean, giving particular attention to any parts the carpets do not cover. The room is now ready for the carpet again, provided there is no papering or painting to be done. Papering may be, and is well put on by many persons for themselves, and plain painting is extremely simple work, such as the manager of no plain country house should require professional assistance for, if she has had the training of her own servants, and can command their services. The heavy furniture left in the room should of course be put in perfectly neat order before the floor is washed, then carefully covered. Carpets should be well and straightly stretched and secured with tacks or hooks as some late patents suggest.

We take it for granted your grates were put in order the first thing, if they had been removed; and that if you use wood, your hearths had been put in perfect repair and painted in your spring cleaning. As the same general directions apply from cellar to garret, we proceed to a few practical hints about paint, paper, whitewash, cleaning, furniture, etc., etc.

PAINTING.

Oil is better for being boiled, skimmed and strained, and some painters boil in

it a few cents' worth of litharge to the gallon, to facilitate drying. Most colors desired can be had ground in oil, in which case they need but to be thinned to the consistence of cream, with oil or turpentine. The last professional painter we employed, used turpentine chiefly for all in-door painting, except hearths, which, like out-door work, is exposed to water, and must be of oil. As we have said, primitive colors are to be had chiefly ready ground, and are mixed in white paint to the shade wanted. Ivory black or common lamp-black, mixed in oil and strained through coarse muslin, is commonly used to paint base boards or common mantles well. Black mixed in white makes a lead color, and yellow mixed in lead gives an olive. We cannot extend this article with particulars, but say, have a large brush for large surfaces, a small one for cracks and crevices, and dipping your brushes lightly into the paint, rub well, always making your strokes the same way and that with the grain of the wood.

A piece of oil cloth laid beside where you are painting, is perfect protection against accidents. Black paint is usually varnished after drying. Hearths require several coats of paint with full time to dry.

WHITEWASH,

For ceilings or rooms, should be of Paris white, or very pure lime. One-half bushel of unslacked lime, slacked with boiling water and covered during the process. When strained, add to it one bucket of thin paste of ground rice, one peck of clean salt, three pounds of Spanish whiting and one pound of clean glue, dissolved in boiling water. It must stand twenty-four hours, then be put on hot with a brush. Common whitewash as above, substituting flour for rice, and omitting the whiting and glue. Whitewash may be made any color by stirring in coloring matter. When large surfaces are to be painted or have a colored wash, keep a plank and try every bucket

you mix, else you may make a shocking pired picture.

PAPERING.

If you must do this yourself, brush over your wall with a solution of one pound of glue to four gallons of water. Make a smooth flour paste, one pound of alum dissolved in three gallons of the paste. Trim one side of your paper neatly, and cut it in lengths of the ceiling's height. Have a long table, lay the right side of the paper down, and spread the wrong side smoothly with paste. Take the two ends of the paper together, (the right side folded together inside.) Step up on your platform and begin at the top, pressing down your paper smooth with a clean towel. The second length will cover the edge of the first, and so on. The figures must be matched exactly as in a carpet, and you should begin in the least conspicuous corner of the room, putting on the first piece by a plumb line. The border will have to be cut in pieces, that you can easily handle and put together accurately. Common paper is easiest hung.

CARPETS

Should be whipped with slender, tapering rods, shaken and well swept on both sides. If they should have been discolored by acids, ammonia rubbed on will often restore the colors. Ink spots may be removed with citric acid or good vinegar. Lamp oil may be removed by continuous applications of pipe-clay or magnesia; but any good colors may be washed in suds, having been previously well wet with water in which beef gall is strongly mixed. Green is the most unsafe color to risk in water.

Bedsteads should be scalded, if necessary; and if there be a remote apprehension of bugs, fill every crevice with strong brown soap, or corrosive sublimate dissolved in alcohol, or mercury mixed in beaten white of an egg. The

polished part of the bedstead, like the rest of fine furniture, having been wiped clean with a towel dipped in soft water, may be rubbed over carefully with fine sweet oil; if your common furniture needs varnishing, you can get suitable brushes and cabinet maker's varnish and do it yourself, but if you have fine furniture, procure the services of a professional man. If spermaceti has dropped on your furniture, cover the spot with magnesia or chalk. Lay several folds of blotting paper over it and set an iron, not warm enough to fade the colors, on it. Heat marks may be removed from a table by rubbing hard on it some oil of vitriol, and afterwards alcohol. Ink, by rubbing on it quickly oil of vitriol with two parts of soft water.

Oil cloths should be wiped over with lukewarm or cold water, without soap; or milk and water.

Matting should be swept clean and washed with clean salt water.

Chintz curtains should be shaken and brushed free from dust, and they may be worn out without washing.

Brocatelle curtains and wall paper may both be cleaned by being wiped carefully with a soft slice of stale bread, or by having perfectly dry wheat bran rubbed over them.

Stoves should be cleaned perfectly, then have a black lustre which is prepared for the purpose, mixed with milk and put on with a paint brush—when dry, polish with a dry brush.

Brasses may be cleaned with oxalic acid or vinegar and salt, but better with fine brick dust—it does not tarnish so soon as when acids are used.

Silver plate, Britannia, etc., should be washed over with whiting, mixed with water. When dry, this should be rubbed off with a soft flannel, and afterwards polished by rubbing with a buckskin. It is an error to wash these articles over, when avoidable, with soap.—*Coleman's Rural World.*

TRADE PERIODICALS.

THE progress of information in the several branches of trade is remarkable. Branch after branch is putting forth its leaves, and the day is at hand when every calling will have its own vehicle of instruction and inter-communication. The most recent of these specialities has just been sent us. It is entitled *The Watchmaker and Jeweller*, and is devoted to the interests of these trades. It is a monthly, of quarto form, in twelve pages of three columns each, and is filled with matter, original and select, of intimate interest to the gold and silversmiths, the lapidary, the watch and clockmaker, and in fact every craft in the remotest degree connected with its mission. Its success is certain, because it is wanted, and that success can be sustained by upholding its standard of usefulness, and making it a thing of absolute necessity which the subscription of two dollars a year must place in the hands of every man concerned in its contents.

We select from its pages the following excerpt from Wood's *Curiosities of Clocks and Watches*. It is entitled—

FIRST DIVISIONS OF TIME.

"It is said that among the early Romans the natural day, reckoned from sunrise to sunset, was divided into twelve hours, those hours, of course, varying in length with the season. The ancient Egyptians, Mexicans, and Persians reckoned the beginning of the day from sunrise. It was divided into four intervals, determined by the rising and setting of the sun and its two passages over the meridian. This was an arrangement not likely to have originated anywhere except in a low latitude, where the four divisions thus formed are never subject to any considerable inequality. When the interval called a day, and containing twenty-four

hours, really begins and ends is rather uncertain; for some nations begin the day at sunset, some at mid-day, and some at midnight. It is not exactly known when the present mode of beginning the day at midnight first came into use, but it appears to have been an ecclesiastical invention. The natural day obviously commences at sunrise and ends at sunset, when the natural night begins; and this seems to have been the earliest mode of reckoning. Afterwards, the day and night became each divided into four parts; and long after this the division into hours was introduced, to correspond with the division of the year into months; and the first hours were, therefore, twelfths of the whole interval from the commencement of one day to that of the next; and probably the subdivision into twenty-four hours arose from dividing both the natural day and night into twelve equal parts.

"We may infer that hours, uniformly of sixty minutes, were not used until some mechanical means of measuring time, as by wheel-clock, had been generally introduced; for, although the sundial and clepsydra, or water clock, are of great antiquity, they formerly represented hours of a length varying with the season; and the latter was adjusted to furnish hours of fifty to seventy minutes each, in order to suit the changing lengths of day and night. So the clepsydra of the Indians gives about twenty-four minutes to a ghuree, thirty of which make twelve hours, or the period from sunrise to sunset. In low latitudes the difference in the day's length is comparatively insignificant; and probably the ancients got on well enough by setting their water-clocks every evening, as the modern Romans and Neapolitans used, until lately, to set their watches—namely, when they

heard the Ave Maria bell. They began their day half an hour after sunset, and counted twenty-four hours.

"In most parts of Italy ordinary clock time is now kept; but in the convents the old practice of keeping ecclesiastical time—that is, dividing the day from dawn to dark into twelve equal parts, and the like with the night—is still in use. In the summer solstice at Rome, the day is fifteen hours and six minutes in length, and each hour of the day is really seventy-five minutes long. The night, on the contrary, is actually eight hours and fifty-four minutes long, and each hour consists of forty-four minutes.

"The old clock faces, like that of St. Peter's, were divided only into six parts, instead of twelve, and the hands went round four times in the day and night. This custom of dividing the natural day and night into twelve equal portions necessitated the setting of the clock every night and morning. The hour of prime was given out by striking successively three strokes on the bell of the principal church, then four, then five, then one single stroke—in all thirteen. Then all the churches set their clocks and tolled the hour. The like was done every evening at vesper time. Doubtless this custom is that which was alluded to by Iago in 'Othello,' when he says of Cassio, 'He'll watch the horologe a double set if drink rock not his cradle.' The double set meaning twice twelve hours."

HEAVY SHIPMENTS OF LUMBER.

The *Saganaw Enterprise*, of the 3d inst, says:

Yesterday the largest amount of lumber left the river that has ever been shipped in one day from the Saginaw valley. Between nine o'clock A. M. and four o'clock P. M., two tugs, and two propellers and twenty-two barges loaded, cleared from anchorage, with seven million nine hundred thousand feet of

lumber, bound for Buffalo and Ohio ports. The fleet was composed of the following:

	feet.
Prop. Antelope and 4 barges.....	2,200,000
“ Colin Campbell and 5 barges.....	1,900,000
Tug Winslow and 7 barges.....	2,000,000
Tug Balize and 6 barges.....	1,800,000
Total feet.....	7,900,000

Which, with the schooners and sail vessels, the number of which we have no means of ascertaining at present, will run up yesterday's shipments to at least eight and half million feet.

A USEFUL BILLIARD TABLE.—Messrs. Cooper and Holt, the eminent cabinet makers, of Bunhill-row, London, have a new and convenient billiard table. Almost every one likes the game of billiards, and especially the ladies, but the ladies cannot go to public billiard rooms, while the large size of the ordinary table precludes its general introduction at home. The difficulty, we are aware, has been partially got over by the construction of small tables; but then the smallest table worth playing on requires a room devoted to itself and its votaries, and this is a thing which cannot always be spared in middle-class houses. Messrs. Cooper and Holt have invented a billiard table of suitable size for moderate interiors, and which, like the chest of drawers immortalized by Goldsmith, is ingeniously contrived “a double debt to pay.” It takes its place in the dining-room as a dinner table, and is completely suited for prandial purposes; but dinner once over, and “the cloth removed,” it is only necessary to pull out two lateral sides, and turn the top slab over, and you have at once a perfect billiard table of from five to eight feet in length, as the size of the room may admit of. The idea of the inventor is a capital one, and calculated completely to meet the difficulties which have hitherto obstructed the general introduction of billiard tables into private houses of moderate dimensions.

OF THE ORIGIN OF BUILDING.

FROM VITRUVIUS.

MANKIND originally brought forth like the beasts of the field, in woods, dens, and groves, passed their lives in a savage manner, eating the simple food which nature afforded. A tempest, on a certain occasion, having exceedingly agitated the trees in a particular spot, the friction between some of the branches caused them to take fire; this so alarmed those in the neighborhood of the accident, that they betook themselves to flight. Returning to the spot after the tempest had subsided, and finding the warmth, which had thus been created, extremely comfortable, they added fuel to the fire excited, in order to preserve the heat, and then went forth to invite others, by signs and gestures, to come and witness the discovery. In the concourse that thus took place, they testified their different opinions and expressions by different inflexions of the voice. From daily association words succeeded to these indefinite modes of speech; and these becoming by degrees the signs of certain objects, they began to join them together and conversation became general. Thus the discovery of fire gave rise to the first assembly of mankind, to their first deliberations, and to their union in a state of society. For association with each other they were more fitted by nature than other animals, from their erect posture, which also gave them the advantage of continually viewing the stars and firmament, no less than from their being able to grasp and lift an object, and turn it about with their hands and fingers. In the assembly, therefore, which thus brought them first together, they were led to the consideration of sheltering themselves from the seasons, some by making arbors with the boughs of trees, some by excavating caves in the mountains, and others in imitation

of the nests and habitations of swallows, by making dwellings of twigs interwoven and covered with mud or clay. From observation of and improvement on each others' expedients for sheltering themselves, they soon began to provide a better species of huts. It was thus that men, who are by nature of an imitative and docile turn of mind, and proud of their own inventions, gaining daily experience also by what had been previously executed, vied with each other in their progress towards perfection in building. The first attempt was the mere erection of a few spars united together with twigs and covered with mud. Others built their walls of dried lumps of turf, connected these walls together by means of timbers laid across horizontally and covered the erections with reeds and boughs, for the purpose of sheltering themselves from the inclemency of the seasons. Finding, however, that flat coverings of this sort would not effectually shelter them in the winter seasons, they made their roofs of two inclined planes meeting each other in a ridge at the summit, the whole of which they covered with clay, and thus carried off the rain. We are certain that buildings were thus originally constructed, from the present practice of uncivilized nations, whose buildings are of spars and thatch, as may be seen in Gaul, in Spain, in Portugal, and in Aquitaine. The woods of the Colchi, in Pontus, furnish such abundance of timber, that they build in the following manner: Two trees are laid level on the earth, right and left, at such distances from each other as will suit the length of the trees which are to cross and connect them. On the extreme ends of these two trees are laid two other trees transversely; the space which the house will inclose is thus marked out. The four

sides being thus set out, towers are raised, whose walls consist of trees laid horizontally, but kept perpendicularly over each other, the alternate layers yoking the angles. The level interstices which the thickness of the trees alternately leave, is filled in with chips and mud. On a similar principle they form their roofs, except that gradually reducing the length of the trees which traverse from angle to angle, they assume a pyramidal form. They are covered with boughs and smeared over with clay; and thus after a rude fashion of vaulting, their quadrilateral roofs are formed. The Phrygians, who inhabit a champain country destitute of timber, choose natural hillocks, which they pierce and hollow out for their accommodation, as well as the nature of the soil will permit. These dwellings they cover with roofs, constructed of logs bound together, covered with reeds and straw, and coated with a large quantity of earth. This species of covering protects the hut from the extreme heat of the summer, as well as from the piercing cold of the winter. The weeds which grow in the vicinity of pools are used in other parts of the covering of huts. Each nation, in short, has its own way of building, accorded to the materials afforded and the habits of the country. At Marseilles the roofs are covered with straw and earth mixed up together, instead of tiles. At Athens, even to this day, the Areopagus, an example of remote antiquity, is covered with clay; and the house of Romulus in the capitol, by its thatched roof, clearly manifests the simple manners and habits of the ancients. It is from such specimens we are enabled to form just ideas of the early method of building. Daily practice made the original builders more skillful, and experience increased their confidence; those who took more delight in the science, making it their exclusive profession. Thus man, who, in addition to the senses which other animals enjoy in common with him, is gifted by nature

with such powers of thought and understanding, that no subject is too difficult for his apprehension, and the brute creation are subject to him from his superiority of intellect, proceeded by degrees to a knowledge of the other arts and sciences, and passed from a savage state of life to one of civilization. From the courage which his gradual success naturally excited, and his engagement in those various speculations with which the arts are connected, his ideas expanded; and from building huts he soon proceeded to the erection of houses, constructed with brick walls or with stones, whose roofs were of timber, covered with tiles. Thus by experience and observation the knowledge of certain proportions was attained, which in the beginning were fluctuating and uncertain; and advantage being taken of the bounty of nature, in her supply of timber and other building materials, the rising art was so cultivated that by the help of other arts, mere necessity was lost sight of; and by attending to the comforts and luxuries of civilized society, it was carried to the highest degree of perfection.

SUNFLOWERS AS DISINFECTANTS.—Experiments in France and Holland have shown that sunflowers when planted on an extensive scale, will neutralize the deleterious effects of exhalations from marshes. This plan has been tried with great success in the fenny districts near Rochefort, France; and the authorities of Holland, assert that intermittent fever has entirely disappeared from districts where the sunflowers have been planted. Though the above facts appear to be proved, it is not yet ascertained what effect the sunflower produces on the atmosphere, whether it generates oxygen, like other plants of rapid growth, or whether, like the cone-bearers, it emits ozone, and destroys the animal and vegetable germs of miasma producing fever.

CULTIVATION OF INTELLECT.

WE cull the following sensible remarks and advice from a late number of *Coleman's Rural World*, and commend them to our young men, who are desirous of taking rank in the progressive march of American intellectuality in company with the morally honest and thoughtfully independent.

"I would speak in this paper of the cultivation of the intellect.

"Young men do not sufficiently value cultivated intellect. They do not estimate its importance in directing all the great interests of human life. The intellect is man's guide. It does his planning, directing, advising, counselling. It thinks for him. All his interests, however dear or high, are put into the hands of his intellect to be disposed of as that shall decide. A man cannot have a safe counsellor, a judicious planner, a wise director in his intellect, unless it is well informed, well exercised and well cultivated. An intellect may be powerful, vigorous, bold, and self-reliant, without culture. It may dare and do great things; but it is not sure, safe, reliable, unless it is well cultivated. It may work ruin instead of safety. It may lead to shame as well as glory. It may debase as well as elevate its possessor. If you be sure of success in business, in the confidence and esteem of your fellows, in your social relations, in any great or good enterprise, you must cultivate your intellects. You can do it in many ways. It may be by the study of books, or men, or things. It may be by contact with the world in business, travel, or by contact with things, as in labor, or acquaintance with nature and art. Anything that causes one to think, to reason, to form opinions, to investigate, to decide for himself, to enlarge his field of knowledge or experience, tends to cultivate his intellect. Reading is one of the best means.

Study is better, and perhaps best of all. Business, well conducted, is good. Travel is good. But thinking is the great thing aimed at in all. Every mind must do its own thinking. It must *know* something—must know much. History, science, the world, literature, opinions, government, customs, religions must be known. The more we acquaint ourselves with the thoughts and doings of others, the more we shall know; and the more we form enlightened opinions concerning our knowledge, the more culture will our intellects receive. Then read, study, think, young men. Do not waste your time; do not barter your birthrights; do not stupefy your intellects with thoughts, evil habits, ignoble aims. Be men! Prepare for useful stations. The world is soon to be yours. All its wealth, professions, learning, business, schools, institutions, churches, will be yours. You must fill its places of honor. You must elect its officers, manage its great concerns. You must write its books, explore its sciences, treasure its wisdom. You cannot do all this without cultivated intellects. Wake up, young men, and see what there is before you. Then how will you appear in your future manhood if your intellect is not cultivated? Would you be clowns and bores? You will be, if you do not cultivate your intellect. How glorious would our country be in future years, if all our young men would cultivate well their intellects. Who will do it? We leave the question with those who read this?"

A TOUR around the world, says an exchange, can now be made in eighty days. The only portion of the route on which steam is not used is about 140 miles between Allahabad and Bombay.

ANOTHER BURNING STAR.

FATHER SECCHI has added a discovery to the many he has already made in the ever widening world of stars. He has discovered a celestial conflagration! He has turned that most wonderful and simple of all instruments, the spectroscope, to the variable star R in Gemini, and he has found it all ablaze! We well remember the thrilling sensation which was caused by the sudden outburst of a star in Corona, in 1866, which shone with the lustre of a star of the fourth magnitude, and gradually disappeared in the formless void, though still remaining as an object of telescopic research. The variable star in Gemini, to which we now refer, attained its maximum brightness in February last, and has been subjected to a careful spectroscopic examination by Father Secchi, one of the unwearied investigators of celestial phenomena. He found its spectrum closely analogous to that of the star in Corona. It shows a brilliant hydrogen ray, and, as near as terrestrial observation can determine, presents the awe-inspiring spectacle of a world on fire! It has taken many years for the light of that burning star to reach our mortal vision; perhaps even now yonder sparkling sun flaming up among the stars has passed into a new form of material existence, and its dependent worlds have been dissolved in vapor. Many years must pass before, even on the swift wings of light, the tidings will be borne to us, for many years, still shining among its peers, will the star be seen by mortal eyes, even when the fiat of Almighty Power has blotted it out forever.

R in Gemini is now the only fire whose mighty blaze we have to watch. The physicists have been busy with two comets of 1868, called Brorson's and Winnecke's, and found them to be masses of burning carbon of extreme tenuity. Winnecke's comet still faintly burns in the northwestern evening sky.

Now, too, we can account for the great star of 1572, which suddenly shone forth in Cassiopeia, with a brightness which made it visible at noonday; now we comprehend the lesser light of Corona, and watch with intensified interest the fire which every night is revealed to our observation.—*Providence Journal*.

WAGES OF FRENCH LABORERS.—The working men of Paris are suffering much from the depression of wages at present. It appears that, notwithstanding the large amount of building carrying on in the French capital, that mechanics' wages are on the decline, and have been so for the last three years. Eighty-five cents was the daily pay of stonecutters and sawyers three years ago. This rate of wages was reduced at the commencement of the current year to 70 cents; and that, what we here in America would look upon as contemptible pay, is now likely to be reduced to 55 cents. French working men had better come here.

VALUE OF PAPER DOLLARS.

The following calculation will be found convenient to those who deal occasionally in gold, and will be found valuable for reference:

When gold is quoted at \$1.10, a paper dollar is worth 91 cents nearly.

When gold is quoted at \$1.15, a paper dollar is worth 87 cents nearly.

When gold is quoted at \$1.20, a paper dollar is worth 83 cents.

When gold is quoted at \$1.25, a paper dollar is worth 80 cents.

When gold is quoted at \$1.30, a paper dollar is worth 77 cents nearly.

When gold is quoted at \$1.35, a paper dollar is worth 74 cents.

When gold is quoted at \$1.45, a paper dollar is worth 69 cents nearly.

When gold is quoted at \$1.50, a paper dollar is worth 66 $\frac{2}{3}$ cents.—*Chimney Corner*.

FINE IMPROVEMENTS.

AMONG the finest buildings erected in this District for several years, may be classed those just completed by T. M. Plowman & Co., on Stoddard near Washington street, Georgetown. In an elevated section of the city, commanding a view for miles over the hills of Maryland and Virginia and the broad Potomac, with the splendid oak-covered ground surrounding Henry D. Cooke's new mansion in the rear, and but a few rods from the present elegant residence of that gentleman, the site is everything that could be desired, combining an excellent neighborhood with a scene of exceeding beauty. The villas are eight in number, in blocks of two, and of a handsomestyle of architecture—a happy combination of the French and Italian characteristics. The block on the corner of Stoddard and Washington streets includes two houses, each twenty-seven feet front, by sixty-five feet in depth, with two stories and a Mansard roof. The front door opens on a wide hall, on one side of which are a front and back parlor, with folding doors, and on the other the library and dining-room. On the second floor are four spacious bed-chambers and a bath-room, and on the third four or five rooms. Between the street and the front is a terraced space, with steps leading from the gate. On the lower story is a fine portico and parlor bay window, and on the second story handsome balconies. The walls are double, with a space of six inches between them, making the house cool in summer and warm in winter. The ceilings, etc., are hard finished, while the doors and other woodwork are painted of neat and subdued colors, giving the rooms a most attractive appearance. The other three blocks of houses are somewhat different in style of architecture, though a general similarity is noticeable, but the interior arrangements are substantially the same. Between the blocks are spacious carriageways,

running to the back yards, which are separated by iron chains, thus giving an unbroken space, nearly four hundred feet in length, which may be laid out in flower beds, and be made most pleasing to the eye. A column might be devoted to a detailed description of these handsome and commodious residences, but the above facts will give a general idea of their advantages. The architects are Messrs. Starkweather & Plowman. Messrs. T. M. Plowman & Co. are the contractors, and have executed their work most faithfully, in carrying out the intention of making these residences of the first class to meet the demands of the wealthy men of this District, or those temporarily sojourning here.—*Washington Chronicle.*

ENAMELLED GLASS.—We have to acknowledge the receipt of numerous tasteful patterns of flocked, etched, and single enamelled glass, from the establishment of Benjamin H. Shoemaker of this city, which we can most conscientiously recommend to architects and builders who desire a really neat and tasty article of ornamentation.

Where it is necessary to dull glass, it becomes desirable that the exclusion of light should be made amends for by the substitution of some embellishment of the surface, and this method before us, accommodating the material to the circumstances, is really worthy of recommendation, and the more so when we find, as in these samples, that the designs are so perfectly in keeping with the requirements of good taste; nothing vulgar or tawdry, all elegant and attractively neat in pattern. The art is decidedly a most useful one, and worthy of general patronage, getting rid of that very primitive and not very pleasing manner of dulling glass—namely, coating it with rice cement, or daubing it with white lead or putty.

THE GROWTH OF NEW YORK.

TO form an adequate judgment of the growing grandeur of the Empire City, it is necessary to walk through its streets; but to gain a simple knowledge of its progress in wealth of architecture, the following items of observation, which we extract from the *Times* of that city, will no doubt be of interest.

PALATIAL MANSIONS.

There has been a large number of what are called first-class residences erected in our city during the year, and even within the past three months the number has not been inconsiderable. Yet last year can show a greater list, and our architects tell us that they have done more business out of town than in town this year. It must be that people are beginning to tire of the exorbitant rents and prices of ground in the city, and have wisely determined on moderate handsome villas in the country. Of the many houses now in course of erection, or just completed, we may take a few as an illustration of the whole.

The fine old mansion at the corner of Twenty-fifth street and Madison avenue, built by Mr. LEUPPE, and recently occupied by the Athenæum Club, has within the last few months undergone some extensive alterations and improvements, which are worthy of notice from the fact that some of them are quite novel, and the mansion, when completed, will rank as one of the most commodious in the metropolis.

The main building has a frontage of forty-five feet on Madison avenue, and one hundred feet on Forty-sixth street. The exterior was covered with what the architect no doubt thought to be ornaments, but which a severe taste would condemn as being worse than useless. They have all been removed. The interior has been entirely remodelled,

and the rooms are now being fitted up with hard woods—black walnut, oak, maple and ebony. A perfect system of ventilation has been introduced, provision being made not only for carrying off the foul air, but (a want forgotten nine times out of ten) for introducing fresh air from the exterior of the building. Steam vapor baths have also been placed in the house, and every other arrangement that an ingenious mind could devise for preserving the health and increasing the well-being and comfort of the occupants has been added. The total cost of these improvements will amount to nearly eighty thousand dollars.

About a year ago the property was purchased by a wealthy Peruvian Señor, F. L. BAREDA, ex-Minister from that Republic to the United States, who, finding the mansion was not exactly to his taste, engaged the services of Mr. CARL PFEIFFER, of No. 4 Broad street, to reconstruct it.

The exterior of the house has been entirely changed, and enlarged by an addition of thirty feet in its depth on Twenty-fifth street. A Mansard roof has also been added. The old and cumbersome ornamental cornice has been taken down, and a plain medallion one substituted. All the heavy carved stone trimmings around the windows have been entirely removed, and the old stoop, with its side steps, has been taken down and replaced by a Tuscan portico, with double columns at each side of the entrance door. Pains seem to have been taken to have the portico in proportions to correspond with the long-established rules of its Order.

The French casement sashes of small glass have been replaced by windows worked with weights and pulleys, and glazed with the best plate glass of the largest size. The usual custom of paint-

ing and sanding the woodwork of the sashes has not been followed, but the color of the trimmings has been varied so as to present a more pleasing and cheerful appearance.

Madison avenue is being built up rapidly. Mr. CHARLES DUGGAN has at present in course of construction ten residences on the avenue and Forty-second and Forty-third streets. The houses are nearly all of the same style; the largest at the corner of Forty-second street, measures 38.5×73 , and 18.6 extension for a yard. The two largest are built of Philadelphia brick, with Ohio stone dressings; three others are built with Ohio stone, and the other five with brown stone. They will have cost, when completed, as follows: one hundred and ten thousand dollars; ninety-eight thousand dollars; three, fifty-eight thousand dollars each; four, fifty-five thousand dollars each; and one, forty-five thousand dollars.

Mr. CHARLES O'CONOR, the lawyer, is erecting a handsome dwelling on the east side of Fifth avenue, above Forty-ninth street. It measures twenty-eight feet front and sixty feet deep, with extension eighteen feet by forty. The building is of Nova Scotia stone, and costs about seventy thousand dollars. On the south side of Forty-eighth street, between Fifth and Sixth avenues, two elegant residences are being erected for Messrs. H. A. GILDERSLEEVE and WM. G. WILSON. Each house has four stories, with high stoop. The basements and first stories are brown stone, and above the first story is built of Philadelphia brick, with stone dressings. These houses cost thirty thousand dollars each. Ex-Mayor OPDYKE is putting up a residence at the corner of Fifth avenue and Forty-seventh street at a cost of one hundred and forty thousand dollars. On the corner of Fifty-third street and Fifth avenue, Mr. T. H. AMIDON is building three residences, which will cost forty thousand dollars each. On the lots commencing at the corner of Fifth avenue

and Forty-sixth street, seven beautiful residences have been erected for Mr. TIMOTHY D. CHURCHILL. They are brown-stone fronts, and are magnificent structures; five of them cost sixty thousand dollars each, and the other two, eighty thousand dollars each. No. 576 Fifth avenue is a new brown-stone residence, the property of Mr. A. MESEROLE, that cost over sixty thousand dollars. Mr. P. LORILLARD's new house, on the northeast corner of Fifth avenue and Thirty-sixth street, is a magnificent structure. It is unusually large, measuring forty-five feet by one hundred and twenty-three. Its cost is estimated at one hundred and twenty-five thousand dollars. On the corner of Fifth avenue and Tenth street is a new brick house, measuring thirty-three feet by one hundred and ten feet. It is owned by Mr. L. KEP.

In Lexington avenue there have been many new buildings erected during the year, the latest of which are two very fine brown-stone houses near Forty-sixth street. Lower down the avenue, turning into Forty-eighth street, we noticed five elegant residences built of Philadelphia brick, with Bellevue stone dressings, for Mr. EDWARD HAIGHT, of the Bank of the Commonwealth. They are very neat but small, consisting of two stories and attic, and cost nine thousand dollars each, exclusive of the ground. In Forty-eighth street, between Fifth and Madison avenues, there is a magnificent residence being built for Mr. C. F. SIMPSON at a cost of one hundred and ten thousand dollars, and in Sixty-fifth street, near Fifth avenue, Mr. HUGH SMITH is erecting a brown-stone front, which, when complete, will have cost eighty thousand dollars.

The same amount is being paid by Mr. L. B. STRONG, for the brown-stone residence going up on West Fiftieth street, near Fifth avenue. Mr. H. W. ROBINSON is expending seventy thousand dollars on a new building in East Sixty-fifth street, near Fifth avenue, and on

the corner of Madison avenue and Fortieth street, is a magnificent and extensive building going up, intended as a residence for Mr. D. HENRY HAIGHT. It is being built of brown-stone, and will cost upwards of one hundred and thirty thousand dollars. Mr. BRYAN McKINNEY is the owner of six elegant residences, now nearing completion, on the corner of Thirty-eighth street and Park avenue. They have brown-stone fronts, and will cost sixty thousand dollars each. Mr. HENRY S. INGLES is laying out sixty thousand dollars on a new residence on Eighteenth street, near Fifth avenue. Further up, on Thirty-sixth street, near Fifth avenue, Dr. ISAAC TAYLOR is erecting a residence adjoining Mr. LORILLARD's; it is built of Philadelphia brick, and cost about sixty thousand dollars. No. 9 West Fifty-second street, is a residence being built of Philadelphia brick and brown stone front, for Mr. JOHN P. HAY, at a cost of forty-five thousand dollars; and one block below—No. 46 West Fifty-first street—is a similar building owned by Mr. NATH. CHENEY. Mr. JACOB KORN is erecting six handsome brown-stone residences on Forty-third street, near Sixth avenue.

INTERESTING FACTS.

Landlords are not so exacting or stiff about high rents for stores as they have been, and are now very glad to accommodate good and trustworthy tenants at reduced figures. This revolution has been caused by the losses which many owners experienced during the year by bad tenants. Men rushed into business without consideration, and rented the finest stores at the highest prices. The result in many instances was bankruptcy, and the landlords unexpectedly found themselves on the list of creditors. They were glad to compromise in order to get possession of their houses. One well-known real estate owner suffered in no fewer than six of these cases during the year.

Another very important matter in the building of New York that demands attention, is the fact that numbers of wealthy Boston men are turning their eyes towards the metropolis, buying ground here and building thereon. It is an association of Boston men that have leased nearly all of the City Hospital property, and are now erecting stores on it. They are induced to come here, because in Boston they can realize but seven per cent. on money invested in building, while in New York the same will return them nearly twenty-five per cent.

Many other buildings of the more costly kind have been erected earlier in the year, and many others are in prospect. Those given in this article, however, are about the latest—either finished or commenced. They tell us of the rapid strides our City is making, and of the near approach of the day when every inch of ground on Manhattan Island will be covered with comfortable houses, costly mansions and magnificent stores and public offices unequalled, perhaps, by those of any other city in the United States, and unsurpassed by any on the Continent of Europe.

THE FIGURE FIVE.

Any number of figures one may wish to multiply by 5, will give the same result if divided by 2, a much quicker operation; but it is necessary to annex a cipher to the answer when there is no remainder; and when there is a remainder, whatever it may be, annex a 5 to the answer. Multiply 464 by 5, and the answer will be 2,320; divide the same number by 2, and we have 232, and as there is no remainder, we add a cipher. Now take 357, and multiply by 5, the answer is 1,785. On dividing this by two, there is 178, and a remainder; we therefore place a 5 at the end of the result, which is again 1,785.

ANCIENT MARBLES.*

THE wonderful discoveries at the Emporium—the ancient marble wharf of the Romans on the Tiber—are to me one of the greatest marvels of the present day in Rome. When we remember that in 872 and 882 Pope John VIII. raised walls and fortifications on this very Emporium spot, in order to defend Rome against the incursions of the Saracens, without touching one stone that rested beneath the accumulated heaps of Tiber mud, it seems all the more wonderful. Then think how many popes and princes there have been in Rome who were so eager for stones and marbles to build their new temples and palaces, that they even laid hands on such famous relics of antiquity as the Coliseum—and all the while the Emporium treasures lay at their feet, with columns and slabs and blocks of enormous value, and in almost inexhaustible quantities. Even such learned antiquarians as Fea, Winckelman, and Jean Baptiste Visconti, overlooked this mysterious quarry-like wharf. To Pietro Ercole Visconti, the eminent representative of this remarkable family, has been reserved the honor of unearthing these treasures and enriching the buildings of this day with them.

If the Emporium belonged to any government, it would be made a mine of wealth. It belongs to the Pope, and he will not sell a stone. He has sent vast quantities away as presents, however, to various parts of the world. The Prussian Government has already expressed its thanks to His Holiness for his liberality to the Cathedral of Aix la Chapelle. The *Univers* of Aix la Chapelle says the Chapter of that Cathedral is so grateful to Pius IX. for his magnificent gift of superb antique marbles, which were needed for the restora-

tion of the Dome of Charlemagne, that it has ordered the shield of the Pope to be placed *ad perpetuam rei memoriam* in mosaics in the pendentives of the cupola, also a Latin inscription to be engraved there, which will recall the donor and his rich gifts to posterity. Salviati, of Venice, so famous for his mosaics, is to execute the work in the Carlovingian style, at the cost of four hundred thousand francs.

Numberless churches in the Italian peninsula have been repaired and adorned with these Emporium marbles, and they have also been sent to France, Germany, and Switzerland—to Marseilles, Lyons, Avignon, Vannes, Meiningen, Bale, &c., and even to Sweden and some other northern European countries. The greatest liberality has been shown in the distribution of the contents of this modern treasure trove of the Tiber. Twenty-five churches in Rome are at this moment using its marbles in having their pavements repaired, altars refaced, and other marble work done. All the marble workmen—*scalpellini*, as that order of them are called—are busy, and for the restoration of the Pantheon of Agrippa—the burial-place of Raphael—the marbles are all drawn from this wonderful emporium.

Within the last few weeks, sixteen large blocks of valuable marble have been discovered there. One of these is a block of rose-colored oriental alabaster, of very great value; another of pavonazzetto—violet color—and several of yellow antique. Formerly Rome possessed only two columns of African marble; those which can be seen at the entrance of the Vatican Basilica—St. Peter's. Fifteen columns of this rare African marble have been discovered this season in the Emporium! The first one I have spoken of in previous letters. It is the one that has been carried up to

* From interesting letters of A. BREWSTER, Esq., to the *Evening Bulletin* of this city.

the Janiculum summit, to be erected as a monument to the first Vatican Council.

A gigantic block of African marble was transferred, a few weeks ago, from the Emporium to the Vatican. Twenty oxen dragged it there. The whole affair, marble and oxen together, had a very severe and barbaric look; it reminded me of some of the bas reliefs on the old triumphal arches. The Romans cheered as the procession passed by, and I felt lifted back many centuries for a few moments.

Thirteen pieces of that curious old stone, for a long time unknown, except by tradition, to the moderns—Murrha or Murrhine, so highly valued by the ancients—have also been found lately at the Emporium. The Romans, it will be remembered, gave fabulous prices for a Murrhine vase. Modern scientific men had many doubts about the composition of Murrha, for the ancients expressed themselves very vaguely about it; and Scaliger, Salmashis, and many others equally learned, even went so far as to say Murrha was no stone at all, but Chinese porcelain. Porcelain itself went by the name of Murrha de Smyrna up to the sixteenth century.

The ancients were very skilful in their china and glass work, especially the workers of Alexandria, Egypt. They possessed the secret of making glass of different colored layers, joined imperceptibly together, which they cut into camei like the onyx. The celebrated Barberini or Portland vase, which was found in the tomb of Alexander Severus, (the lofty tumulus of Monte del Grano, near Porta Furba, about three miles from Porta San Giovanna,) and which was believed to be genuine sardonix for some time, has been found to be an artificial substance of this nature.

All these facts strengthened the doubts about Murrha. To be sure, there was Pliny's description of "Murrhine," which made other learned ones think it must have been a mineral something like fluor spar, with a stratum of hornstone. At

last the doubts were all settled by a piece of genuine Murrha or Murrhine being found some years ago under the ruins of a house in Rome, by a dealer in antiquities. This the Jesuits purchased, had it cut into thin slices—a process better understood by the *scarpellini* of Rome than any other marble workers in the world—and it now forms the front of the main altar in the Church of the *Gesu* at Rome. It corresponds with Pliny's description. It is purple in color, with a stratum of dull white through it; on the edges of the white layer is a slight iridescence; in some parts it has a reddish hue, and it also has crystals imbedded in it, as Pliny says. The thirteen precious bits of Murrha lately found at the Emporium will probably be used for some church decoration or altar vases.

OIL AMONG THE ANCIENTS—The ancients knew no method of refining oil. As a great luxury, they mixed it with perfumes, such as essence of roses and sandal-wood; but this rather detracted from than added to the burning properties of the liquid, and all that was obtained by the process was an increase of fragrance and a diminution of light. The dwellings of wealthy men, like Verres, Mæcenas, and Lucullus, who expended extravagant sums upon scented oils, would not have borne comparison, in point of lighting, with the grimiest tap-room of a gas-lit public house. The gold and silver lamps, hung by slender well wrought chains to marble pilasters, only yielded at their best a lurid tapering flame, that gave out an enormous deal of smoke, fluttered in the slightest breeze, and went out altogether at a gust of wind. Neither was it possible to steady the light by closing the apertures through which the air came; for, had Roman or Grecian houses been possessed of glass windows, they would soon have become uninhabitable.—*All the Year Round*.

A FORGOTTEN ARCHITECT.

IN a book published in 1813 entitled "History of the Origin of Gothic Architecture," by John Sydney Hawkins, F. A. S., we find the following interesting sketch of the romantic life of a singular genius to whom Fate seems to have been anything but lenient, and as he has done some service to the profession in his day, we deem it but fair to keep his memory alive even now in our age of enlightenment.

His history is doubtless not without a parallel even in our passing day, and this fact makes it interesting.

"Of Cæsar Cæsarianus very little is mentioned by any biographer, though he has himself, in his Commentary, left several particulars of his history. Vitruvius having, in the first chapter of his sixth book, returned thanks to his relations for the education they had bestowed on him; his commentator, Cæsar Cæsarianus, is induced to imitate his example in a case by no means parallel, as it is manifestly Cæsar's object to exhibit his sufferings, in order to attract compassion, at the time when he professes to conceal them. However, in a very long note on the above-mentioned passage in Vitruvius, he gives, fo. 91, a, the ensuing facts relating to himself.

"His father, whose name was Laurence, was a man of considerable literature, and eminently skilful in the civil law, by which means he came to be employed in the business of the chancery of Bona Maria and John Galeazzo Maria Sfortia Visconti, duke of Milan. On account of these his merits, and by the advice of Ciccho Symoneta, one of the ducal counsellors, these persons bestowed on him the office of the chancery of the chief-justice-ship in Milan, of which he was a citizen. Cæsar was educated by his father himself, from the age of four years and a half, so that he was able to repeat the whole grammatical work of Donatus;

but soon after this his father died, leaving him an orphan. Finding his end approaching in the village of Prospiani, his father was desirous of making his will, and communicated to Elizabeth his then wife what he intended for Cæsar's benefit; but she would not permit Joram de Magistris to be sent for: there being, therefore, no notary present, the father left his property for Cæsar on the promised fidelity of her, who, as Cæsar singularly expressed it, was afterwards called his stepmother.

"Upon his father's death she married a notary; and when Cæsar had arrived to the age of about fifteen, she, one day in a rage, because he wished to follow the ducal court with his preceptors, threatened that, if he did not forever quit his father's house, she would certainly poison him. Upon this, Cæsar had recourse to Andrea de Vicomercato, formerly chancellor to the duke, a pupil of his father's, who assisted him with a small sum of money, in consequence of which Cæsar left Milan, and wandered from place to place for hundreds of miles, and into various cities and countries, conversing with those whom he met with, and pursuing his studies. This he was enabled to do by means of his daily gains, which rose from the practice of painting and architecture.

"After this, the ducal courtier Joannes Symon Resta, finding Cæsar one day in the church of St. Benedict, took him with him to Ferrara, and there Cæsar employed himself in the comedies for Hercules the duke. It happened, however, that Antonio Visconti, ambassador from duke Lodovic, who was also of the ducal family, was at this time resident there. This person was much addicted to philosophical and mathematical studies; and several of the professors of that university having recommended Cæsar to him, he retained him

for some time for the purpose of demonstrating the schemes and diagrams of some abstruse lectures which Cæsar effected from the writings of the Greek and Latin authors. After wandering about for nearly sixteen years, Cæsar at length, at the desire of his stepmother, and the request of others, returned home, with the view of delivering her from the ill treatment she experienced from her own sons. Having been taken as an architect into the service of duke Maximilian, and dismissed by the populace, he returned once more to the siege of the citadel of Jove, in consequence of the victory at Novara; but having intrusted to the care of his stepmother some articles of his property, she returned to him scarcely any thing more than his translation of Vitruvius. For these his misfortunes he endeavors to console himself by the examples of Aristippus the Socratic philosopher, and of Julius Cæsar, who, as he says, in the Alexandrian war, to avoid the Egyptian vessels by which he was annoyed, leaped from his ship into the sea, carrying in his hand his Commentaries. After this he introduces a cut of the elective world, as he calls it, as he wishes that, and his own situation in it to be, and in which he gives a portrait of himself, but in so rude a manner, and so small, that it conveys no definite idea of his person, conducted by Patience, Prudence, and Boldness, to that station to which he conceives himself entitled. He complains of being deserted by all his father's relations; but says that Aloisius Pirovanus, a patrician of one of the noblest families of Milan, and most skilful in arithmetic and geometry, had been induced to patronize him with a fatherly affection.

"Further on, he says that this work might perhaps be the means of ingratiating himself with his stepmother; and adds, that he had been about twenty years engaged in preparing it, and through the misfortune of Aloisius Pirovanus was compelled to publish it, not

being able, without constant and intense diligence, to send it forth in the sixth, when he ought to have revised it in the ninth year.

"After this, he rhapsodically and absurdly requests the genius of Milan, the royal majesty, all future princes, the rulers, senators, and all other learned persons and heroic patricians, the clergy and nobility, the ædile D. Pietro de Novate, together with all other counselors of the republic, the society of architects, and all princes, governors, ædiles, and architects, throughout the whole world, the learned and well-informed, and all the readers of his book, to pardon small faults, and to take the work under their protection, to get it revised and reprinted more correctly, either in the Latin or the common idiom, as they should think best, and always to renew the cuts, as they were all regulated by symmetry and good proportion, entitling it with his name and surname, in memory of him their patrician Cæsar Cæsarianus, as the whole had been accomplished by him with very small assistance from any other person.

"A little further on, still speaking of his translation, Cæsar, fol. 91, b, says, let it not only now, but 1538 years after the publication of his Vitruvius, be related by some person in the world, that he had been able to expound the obscure senses, and affected and mysterious sayings, which through the great ignorance of them which prevailed, had appeared like enigmas; and that he had also amended and explained the Greek and Latin words in each of the ten books of Vitruvius, with cuts and notes which show the sense of the text, so that architecture might be well understood. 'Therefore,' says he (to give an exact translation of his own words), 'if God and Nature do nothing in vain, I certainly think the Divine will had directed I should be born, and made me so learned in philology and architecture, in order that I might become the expounder of this divine work, and leave it in the

world for its great utility, and especially as many very learned men have labored to explain it, but have not been able to do so for want of understanding the terms. And as I was contented to perform the Divine will, it has enabled me to support the greatest misfortunes and miseries, as I have related; which unspeakable misfortunes thus suffered I forbear to state fully, in order that the reader may not be perhaps induced to shed some tears at my miseries, since I am, as it were, all my life through my stepmother and her sons rendered not only a kind of exile from my own country, but am disinherited of my father's property, and my own paternal house.' This last circumstance he explains no further; but mentions that Antonia Briuscha, and her nurse Magdalen de Cuticis, his stepmother's mother, had procured him to be of the sacred and elect clergy of Milan, hoping to obtain for him other property to a greater amount than his father's.

"These passages, in many instances, strongly indicate a degree of eccentricity, in some respects nearly approaching to insanity; but it is evident that this was only partial, as his character as an architect and geometrician has never been questioned, and the rules he has laid down have, as will be noticed hereafter, been uniformly found correct and authentic.

"Notwithstanding the heavy complaints which Cæsarianus utters respecting his stepmother's cruelty, there is great reason to think her ill treatment of him might not have been without provocation on his part, if it is not, after all, very much exaggerated. Her objection, in the first instance, to his following the ducal court, seems to have had more of judgment and discretion than his resolution. It certainly implies a degree of concern for his interest, which is totally inconsistent with any idea of her driving him from home; besides that his leaving home was what she had already opposed. The increase of his

property to an amount beyond his father's, which he himself had assigned as the motive of her mother and Antonia Briuscha in procuring him to be of the clergy of Milan, most certainly shows a regard for his welfare, even had it appeared, which it does not, that they were mistaken in their opinions on the subject. Nor is Cæsar's conduct according to his own relation, by any means free from a great degree of inconsistency, when, after having all along represented his stepmother as an implacable and inveterate enemy, down to the very time when he was writing that account, and after having, as he says, experienced her as such for sixteen years or more, he, without any intimation of a reconciliation on his return, confesses he intrusted to her care a part of his property.

"Throughout the book, and his own conduct, as described by himself, enough of Cæsarianus' temper is disclosed to convince any unbiassed person that a residence with him must have been almost insupportable. In his writings he plainly discovers an unbounded conceit of his own abilities and attainments, and seems to consider himself as almost the first of the human species in point of intellect. His resolution to follow the ducal court in opposition to his stepmother's remonstrances to the contrary, is a decided proof of his obstinacy; and he seems, from his subsequent conduct, to have been one of those headstrong characters which sometimes occur, on whom kindnesses are ill bestowed, and whose perverseness and misconduct render them incapable of profiting from that assistance which is actually afforded them. Like most persons of this description, he appears to have suffered severely from his own pertinacity of opinion; for he frequently mentions his poverty, which, as he speaks of maintaining himself by the practice of painting and architecture, and never complains of the want of employment, a common degree of prudence

and discretion would probably have prevented.

"As an architect and geometrician, the character of Cæsarianus has always stood high; but as an author and man of literature, he is entitled to no estimation. His style is a mixture of Latin, frequently barbarous, with corrupt Italian introduced in scraps, so that some words shall be Latin, and the next a mixture of Italian; or one part of a sentence is often Italian, compounded, however, of words from the Latin and Greek, but with Italian terminations, and the rest of it Latin, such as it is. His object in most cases appears to have been the introduction of as many words as possible, probably thinking, as bad writers frequently do, that verbosity tends to perspicuity, which in fact it utterly destroys. For instance, fo. 15, a, he styles an octagon tower, *Octagon hecubata tholata pyramidata*, because it is formed on a cube, has a cupola or dome, and supports a pyramid. If he had simply described it as an octagon, it would have been sufficient, because nothing depended on the other particulars. His sentences are extremely long, complex, and involved, and frequently disjointed; so that two passages which relate to each other are not seldom at a distance, with others which have no reference interposed. They are connected in a manner totally repugnant to all ideas of style and composition, and evidently show that when he repeated, as he says he did, Donatus's grammatical work to his father, it must have been without understanding it, or knowing how the rules were to be applied.

"Besides all this, the book is one of the most incorrectly printed that can perhaps any where be found: two words perpetually occur printed as one, and one as often divided into two. The punctuation is also abundantly faulty: no points are used but the colon and the period; a point very often is placed where there should have been none, by which means nonsense is produced; and

others are omitted where the sense necessarily required their introduction.

"Nor have the cuts in any cases, which undoubtedly were all copied from his own drawings, stronger marks of accuracy. In one instance particularly, namely, the sectional view of the nave of the church of Milan, with the external representation of the transept, he has inserted a multitude of letters, to none of which he refers in the explanation; but, on the contrary, says, the cut may be understood from what had been given before.

"From these circumstances and the specimen of his style already inserted in a note, the reader must necessarily perceive how great must have been, in the present case, the labor and difficulty of discovering the meaning and correcting the errors of so confused and inaccurate an author, though, after all, his principles are certainly right, and have proved so on experiment.

"His conduct to Aloisius Pirovanus, whom he himself mentions as one of his best friends and patrons, appears to have been an example of injustice and ingratitude perfectly unprovoked; for at the foot of the errata, quite at the end of the book, is an advertisement from Augustino Gallo and Aloisius Pirovanus, in which they state, that about the end of May in that present year, 1521, Cæsar Cæsarianus, having written the Commentary as far as the place before mentioned (namely, the end of the sixth chapter of the eighth book), and delivered the copy to the printers, had, notwithstanding his engagement to the contrary, quitted Como, where it was then printing, and left the work imperfect, to their great loss, as they had hired the printers, who demanded to be paid. For the completion of the work, Benedicto Jovio and Bono Mauro were employed, and some of their variations are there stated.

"At the end of book viii., chap. 6, fo. 154, b, in a note, it is said, that Augustino Gallo of Como, and Aloisius Piro-

vanus, patrician of Milan, the principal authors of that impression of Vitruvius which Cæsar Cæsarianus was long since to have prepared for them with the assistance of others, and which had been printed as far as to that place, though deprived of his assistance, had determined to complete it, and had employed Benedieto Jovio of Como, and Bono Mauro of Bergamo, to prepare the remainder for the press. And again, in an address which follows the titles of the chapters at the beginning of the work, and is entitled, *Oratio Patritiis Populoque Mediolanensi*, Aloisius Pirovanus says, that not without great expense he had had drawings made by many excellent masters, which he had also procured to be engraven by no common artists, and that Augustino Gallo, Referendary of Como, and himself, Aloisius, of the noble family and ancient race of Pirovano, a citizen born of Milan, and a professor of arithmetic and geometry, by no means of low rank or unknown in that city, had hired men possessed of that kind of science, who had faithfully corrected, translated, and explained the work; and that among these was Bono Mauro of Bergamo, who had completed the translation of the text, cleared up several difficult passages, and restored to their true order others that were confused, before the work was delivered to the printers. He adds, that this person had been unjustly deprived of his due praise, having been styled only the corrector of those errors which frequent impression had introduced; and that, besides what was already noticed, he had drawn up and reduced into alphabetical order the table of words at the beginning of the book, which seems intended as a kind of glossary.

"No apology for Cæsar's conduct, or circumstance to account for it, any where occurs; but as, in the passage where he speaks of his poverty as a hinderance to the correction of his work, he says, that that and the misfortune of Pirovanus had compelled him to publish

his book in the sixth, when he ought to have revised it in the ninth year; it is probable he thought himself hurried to publish it prematurely, and took offence at that circumstance. Any reader, however, will immediately see that Cæsarianus's faults are radical and incorrigible, not rising from oversight but ignorance; and no correction or revision by him was ever likely to have removed them, for he who could commit them in the first writing could not have had the sagacity to discover them in the revision.

"To his account of himself, and the before-mentioned relation of his departure from Como, little is to be added. It appears however, from Cæsar's own Commentary on Vitruvius, fo. 70, b, that Bramante the architect was his preceptor; for, speaking there of the vestry of St. Satyrus, he says, it was built by his master Donato di Urbino, surnamed Bramante, and it is also known that he himself was for a time architect, or rather surveyor, to the cathedral of Milan, for the purpose of keeping it in repair; which probably led him, and gave him the means, to measure and examine so minutely as he has done the proportions and principles on which it was constructed.

"After his departure from Como in May 1521, nothing further is known of Cæsarianus's history, nor even at what time he died. All that Vasari could learn was, that Cæsarianus, who wrote the Commentary on Vitruvius, when he had lost all hope of obtaining that reward of which he had formed expectations, became so morose and savage, that he would from that time do nothing; and that, being rendered wholly ferocious, he died more like a brute beast than a human creature; which, considering the specimens of his temper and conduct, as they appear in his own narrative, is extremely probable."

There are to be found amongst architects, at this day, men as erratic and unfortunate, whose indomitable pride leads them into suffering and misery.

LOVE OF GARDENING.

"In Eastern lands they talk in flowers,
And they tell in a garland their loves and cares;
Each blossom that blooms in their garden bowers
On its leaves a mystic language bears."

MANY of the wisest and best of men have signalized their love of gardens and shrubberies by causing themselves to be buried in them—a custom once frequent among the Greeks, Jews, and Mexicans.

Orpheus is said to have been buried in Thrace; and his monument was surrounded by olive trees, in which a great number of nightingales were accustomed to build; Plato was buried in the groves of Academus; Wieland buried the wife of his heart in his garden at Osmannstadt, where he was afterwards buried himself; and Sir William Temple, though he expected to be interred in Westminster Abbey, gave orders for his heart to be enclosed in a silver casket, and placed under a sun dial in that part of his garden immediately opposite the window of his library, from which he was accustomed to contemplate the beauties and wonders of his garden.

An ardent lover of nature himself, the Marquis de Girardin thought he could not inter his unfortunate friend Rousseau more to the satisfaction of his immortal spirit than by burying him in the Island of Poplars, situate about ten leagues from Paris.

This eccentric genius, as was justly and nobly observed by one of his bitterest enemies, possessed the head of a man and the heart of a woman. He once took up his abode in the Island of St. Pierre, rising in the Lake of Bienne. Since his residence it has been called Rousseau's Island. This isolated spot is one of the most beautiful in the country; hence, during the vintage, parties of peasants filled the woods and amused themselves in dancing, running, and strolling about, enjoying the cool-

ness of the shade and the freshness of the water. The pleasure which Rousseau enjoyed in this retreat, for a short time, obliterated all sense of injury and misfortune. "I was permitted," says he, "to remain only two months in this delightful island; but I could have passed there two years, two centuries, all eternity, without suffering a moment's fatigue; although my whole society consisted of the steward and his family, I esteem these two months as the happiest period of my life, and so happy that I could have passed my whole existence without even a momentary wish for another situation."

After a short time spent in this retreat, in a manner so delightful to his imagination, the unfortunate hermit unexpectedly received a peremptory order from the government of Berne to quit the island. On receiving this order, finding that fortune was his irreconcilable enemy, he gave himself up to despair; and petitioned, with all the ardor of a disordered mind, to be condemned to perpetual imprisonment. The only indulgence he required was, to be allowed the use of books, and to be permitted at certain intervals to walk in the open air. Even this was denied him.

"The study of botany," says Dr. Aiken, "caused several summers to glide away with me in a more pure and active delight than almost any other single object ever afforded me. It rendered every walk and ride interesting, and converted the plodding rounds of business into excursions of pleasure."

Don Emanuel, of Portugal, was an admirer of gardens. A lover of music and a cultivator of science; this illustrious prince wore mourning for the loss of men of merit; and history decrees him the honor of banishing distress and poverty from his kingdom.

And here, though last in order, not

least in our estimation, permit me to record an instance of pure taste in a man living in the humblest sphere. His name was Morgan, and he was employed in one of the furnaces in the county of Monmouth, England, for upwards of thirty years. All day, and frequently a part of the night, he stood before two immense furnaces, not only in winter, but in summer. He was the picture of an Ethiop; yet his house was clean, and his garden well ordered "The greatest delight in the world, sir," said he one day, "is a garden; and the best ornament a poor man can have in that garden is a hive of bees." In my youth, too, I knew a young man who won a rich, beautiful, and accomplished wife, by sending her as a present a small collection of flowers, inserted between the leaves of *St. Pierre's Studies of Nature*. The lady was beset with admirers; but she had the good sense to be more captivated with this delicate indication of affection than with the inane gallantry of men who had little to distinguish them but vanity and vacancy, wealth, and a very exalted opinion of their own importance.

The art of gardening was known to the Carthaginians, who were exceedingly attached to flowers.

But the Greeks had little taste for flowers, except as sensual excitements. They seldom imported plants, and took but little pains to improve their indigenous botany.

The Britons were ignorant of this luxury till it was taught them by the Romans. In the time of Agricola, however, they had made great progress, and had reared several species of flowers and fruits; having found their soil sufficiently rich and various for almost every European fruit, except the vine and the olive. The Dutch were late in deriving profit or pleasure from this pursuit. The taste once imbibed, soon became so captivating that they named many of their flowers after distinguished statesmen; four thousand three hundred dol-

lars were paid for a single Semper Augustus; for three of them together, eleven thousand dollars; for one hundred and forty-eight grains weight, fifteen hundred dollars; for two hundred and ninety-six grains of Admiral Liefkenshoek, more than thirteen hundred dollars; for Admiral Enkhinzen, more than two thousand dollars, etc. In 1835, the bulb of a new tulip, called *The Citadel of Antwerp*, was sold to M. Vanderwick, of Amsterdam, for three thousand two hundred dollars. For a Viceroy, on one occasion, were paid four tons of wheat, eight tons of rye, four fat oxen, eight pigs, twelve sheep, two hogsheads of wine, four barrels of beer, two barrels butter, one thousand pounds of cheese, a bundle of clothes, and a silver pitcher.

At an auction in Alckmaer, some bulbs were sold for more than thirty thousand dollars. An individual, in Amsterdam, gained more than twenty-three thousand dollars by this trade in four months. In one city of Holland, it is said, more than ten million tulip bulbs were sold.

Hyacinths first began to rise in estimation in 1730. In that year six hundred and fifty dollars were paid for "*passe non plus ultra*," and in the same proportion for others. Between Alckmaer and Leyden there are more than twenty acres of land appropriated to hyacinths alone, which thrive best in a loose, sandy soil. The Chinese, too, are accustomed to give large prices for the Montan; hence that flower is not unfrequently called the *Paleangkin*, a word signifying "a hundred ounces of gold."—*Horticulturist*.

It is proposed to cut a canal from the five lakes in South Carolina, forming the head waters of the Ashley river, to the navigable portion of the river, in order to secure easy transportation for the phosphates recently discovered there. The cost is estimated at about \$3,500, and it is said over \$6,000,000 worth of the deposits can by its means be transported cheaply to Charleston.

THE PRESERVATION OF IRON.

THE great enemy of iron when used in architectural or engineering work is oxygen. We would not be understood to ignore other causes, the tendency of which is to hasten the destruction of bridges, etc., such as expansion, the production of a crystalline state of the metal by vibrations, etc., but these causes apply only to special cases, while in all cases, unless something interferes, oxygen slowly but surely gnaws away at every bit of iron exposed to its action.

A great many methods have been employed to prevent the rusting of iron, by which is meant its chemical union with the oxygen of air, water, or other medium in which it may be placed. In the case of saline waters, the reactions are more complicated, but the final result is the same, namely, the oxidation and disintegration of the metal. Unprotected iron rusts away much faster in such waters than in common air; but exposed to the action of the ordinary substances, to be found in all places where structures of iron are located, the ultimate destruction of such structures is merely a question of time.

But while the vibratory motion of iron tends to render it brittle, and change its physical character from a fibrous to a crystalline material, such motion acts, in some yet unexplained manner, to combat the affinity of oxygen for iron. Hence the old proverb, that "the used key is always bright," has more foundation than the polishing effect of wear.

In machinery it is common to paint or otherwise protect the stationary parts, while the moving parts have been found not to require much protection, when properly shielded from damp. In many cases castings will stand in a shop just as they have been taken from the sand, without rusting, being protected by a

thin film of silica from the melting of the sand during the process of pouring, but as soon as exposed to the action of water this protection fails, and they rapidly become coated with rust.

The processes most generally applied to shield iron from the action of oxygen, have for their object the isolation of the metal from this gas.

The coating of iron with metals is one of the most important of the means employed for this purpose; tin and zinc being the metals most frequently used. But these metals will not permanently protect iron in all situations, and they cannot in many instances be applied.

Another class of substances are paints, tar, linseed oil, etc., which form coatings upon the surface of iron and thus isolate it from oxygen. None of these can, however, be relied upon as a permanent protection; and they have to be from time to time renewed upon parts where the metallic surface has become exposed. It has been regarded by some as quite doubtful whether any cheap and practicable method for the prevention of iron rust, that will permanently secure this object can be devised, yet it would seem, with all the great resources of modern chemistry, this problem should be capable of solution.

As yet iron cannot compete with stone in structures designed to endure the effect of time, without repeated attention to keeping its surface covered with some protective covering; and until it is enabled to do this by some improvement in methods of protection, its use for engineering and architectural purposes can never entirely supersede that of stone, if, indeed, it can ever compete fully with stone in other respects. What is wanted is something equally applicable to large or small pieces of iron, and which will answer to ward off the attacks not only of the common

atmospheric oxygen, but will also remain unaffected by acids or salt waters. Who will give this to the world?—*Scientific American.*

THE SUEZ CANAL.

IT was an idea of the great Napoleon, founded upon the actual performance of the old Egyptians, to connect the Red Sea with the Mediterranean. That idea is about to be consummated. The work of the Suez Canal has come so near to an operative state of completion that the admirers of its great engineer are celebrating his triumph, and arranging for its opening to the commerce of the world. The history of the great canal as a project has been extraordinary; the work itself is gigantic. Further back than 1846, M. Ferdinand de Lesseps conceived the plan of his achievement. By long intimacy with the Viceregal family and court, he won from Egypt a concession for the enterprise, and in 1854 organized his company. The canal, with all its windings, will be one hundred miles, though in a direct line it is but seventy miles long, running through four lakes, and between the termini of Suez and Port Saïd, in a channel variously from two hundred and forty-six to three hundred and twenty-eight feet wide, and twenty-six feet deep. At Port Saïd, on the Mediterranean, two breakwaters, nearly two and three thousand yards long respectively, and including a triangular area of five hundred and fifty acres, have been built to form a complete harbor. They are hugely formed, being twenty-six yards at the base, twelve yards in height, and six at the summit. At Suez a mole eight hundred and fifty yards in length was to be constructed, equally as a protection against gales and tides, for the dredging of the Suez channel, and for the reclamation of lands. Statistics show that the Nile pours out thirteen million cubic yards of sand and mud

into the Mediterranean, which obstructive volume is borne toward the shore of the Mediterranean near Tynah, filling up the sea thereabouts with shifting mud and sand. Hence, the great breakwater of Port Saïd. But it is upon the Suez side the work encountered its greatest trials. Both provisions and water, of which the adjoining country was barren, had to be brought from Cairo, the latter by a system of pipes. One great effect of the work, significant as to its future benefits, is that the population of Suez has been increased by it from four or five thousand to twenty-five thousand, and much the same may be said of the other canal towns, Ismaila and Port Saïd. Up to April 30th of last year, more than fifty-seven million dollars had been spent on the canal, a total of receipts of nearly seventy million dollars, derived from such fractions of the great canal as are in operation. The Suez enterprise is even now almost an overwhelming success. The effect upon the world of M. Lesseps' herculean exploit will be similar to that of our own great trans-continental railroad. The trade which meandered through months about the African coast and around Cape Good Hope, and across the Indian Ocean, will count its journey rather by weeks. Both by the Suez route and the canalization of Central America and Mexico, the trade of the world is bound to undergo immense revolution.

In Paris, of 2,000,000 inhabitants, the capital counts only 25,000 really wealthy persons, 160,000 who scarcely enjoy an easy competence; then a floating population of 100,000 foreigners and provincials, making in all 300,000 who spend freely. But, by the side of this wealth and comfort, is a formidable army of laborers, mechanics and clerks, three fourths of whom would lack the necessities of life if work were to fail them only a single month.

PARTITIONS.

THERE is nothing so concerns the actual strength of a house, internally, as those division walls which are called "partitions." They relieve the external walls of much of their burden, and, more than that, they act as bracers or binders for the whole skeleton of the house. Even the roof is dependent in a very great degree on these partitions, and it is owing to their presence and strength that the general construction of a dwelling is more or less strong.

In Europe the framing of partitions is executed with particular care, much more attention being paid to it there than in this country. Rough as these constructions appear, they nevertheless demand a certain amount of scientific skill, as permanency is the great requisite there, things not being as transitory as in our land of ever-varying notions.

Our house carpenters are but too apt to slight this most particular feature of their work. That is, they are content to "bridge it," which they consider as doing all that is necessary to secure the stiffness required. However, they not unfrequently fail in securing the plastering from showing most unseemly cracks at times, which, although wall-papering may hide them, are the accompaniments of a weakness which, in its increase, becomes often most injurious.

In view of permanency, partitions should always be well braced, and the braces so disposed as to throw the superincumbent weight laterally towards the walls. This office of the brace is the one on which its utility chiefly depends. Economy is a reason for the employment of the brace in parts of Europe, and in all countries where lumber is scarce and dear, for it affords a chance to use up stuff that might otherwise be wasted. Partitions after being put up should be suffered to remain exposed for a sufficient time to the ac-

tion of the atmosphere, to give a chance for shrinkage before lathing and plastering on them. The shrinkage of the joists on each floor, though but one-eighth of an inch, is considerably increased in the partition up through the house, where the joists lay on the partition heads; for one-eighth of an inch on the ground-floor makes a quarter of an inch on the next floor, and so on in the same multiplying ratio; for this reason some builders have considered it more advisable that partitions should have no sills, but the studs be carried down between the joists, and framed into the head of the partition immediately below. Though this is correct in theory, nevertheless the sill is advantageous as making the partition much stronger. This, with bridging, is apt to make strong partitions. Where a partition is to be framed so as to have a door leading from the stairs into the drawing-room, and also with folding or sliding doors between the front and back parlors, or other rooms, the head of the partition in this case should be well trussed with oak, having a straining beam in the middle, two queen posts, and two braces, with lead at the abutment joints; these pieces are then to be forced together with bench screws, and kept in their places by wedges passing through the auxiliary heads.

Some authorities think that all plates and cross-ties of such partitions should be made to camber very considerably, the curve gradually increasing as the stories ascend; and all the floors, ceilings and door-heads should conform to this camber, which should not be less than half an inch on the first floor, an inch on the second floor, and an inch and a-half on the third floor, and so on in proportion. If this precaution be not taken, in less than two years (think those authorities) the floors and ceilings

must fall out of level at their centres, as much both from the shrinkage of the timber, and from the strain upon it from burden. The door-jambs fixed in such partitions invariably strain out of square at their angles, more or less, in proportion to the dryness of the timber, the skill exercised in trussing the work, and the degree of burden cast on the partitions. Therefore all such jambs should have their heads fixed somewhat out of level, so as to settle permanently to a correct square form, instead of being fixed level, so as to settle permanently out of square. In general, plates immediately above the floors should be omitted, as the more horizontal timber there is, the more shrinkage there will be, and consequently the more settlement; and such plates mostly require to be cut through for doorways, they are rarely of use as ties to the work. Under each end of each truss a granite, or any hard stone templet, three or four feet long, should be set; these should be strongest and longest where the trusses act with most energy.

Dr. Percy, an eminent English authority, says: "Wainscot partitions are such as are framed in panel work. These partitions did not come into general use till Elizabeth's reign, though panelled framework to walls was known before, as we have it on record that the house of Richard Fermor, of Eustave, gent, (time of Henry the Eighth): 'The sides of the parlor were ceiled (panelled) with wainscot.'"

And at Wressil Castle, in Yorkshire, "the sides of the rooms were ornamented with wainscot, containing a great profusion of ancient carving, finely executed in wood, exhibiting the ancient bearings, crests, badges, and devices of the Percy family, (so renowned in Chevy Chase,) in a great variety of forms, set off with all the advantages of painting, gilding, and imagery."

There is a very erroneous idea extant amongst joiners that the common framed panel partitions are wainscot. As these,

however, are seldom to be found on this side of the Atlantic, the misnomer is scarcely worth noticing, as it is used only by English joiners.

THE DARIEN CANAL.—M. E Cullen, M. D., writes as follows: The Pacific Railroad being completed, and the Suez Canal likely to be soon open for traffic, the junction of the Atlantic and Pacific by a ship canal across the Isthmus of Darien is the next great work to be executed, and must now take its turn as a matter of course. It is time, then, that the attention of capitalists and engineers should be directed to this project, and that a detailed survey should be made of the line for the future canal, which is only thirty-nine English miles in length. This line has, at its Atlantic terminus, Caledonia Harbor and the Channel of Sassardi, and at its Pacific terminus, the Estuary of the Savana and Tuyra rivers, and the Gulf of San Miguel, all those harbors being perfectly secure, and admirably adapted for the entrances of a grand inter-oceanic canal. The ground is of moderate elevation, and presents no difficulties which the ordinary resources of engineering science may not readily overcome. As one engineer with four assistants could complete the survey in a few months, it is to be hoped that immediate steps will be taken to commence this necessary work.

DAVIDSON COLLEGE.—At a late meeting of the Trustees of the Davidson College, W. J. Martin (formerly Professor of Chemistry in the North Carolina University) was elected Professor of Chemistry. The election of a Professor of Languages was postponed till the next annual meeting of the Board.

The college has recently purchased, in New York, the "Brumby Cabinet," one of the most valuable collections of minerals, etc., ever made in the Southern States.—*Charlotte Democrat.*

EUROPEAN NOTES.

NEW COPYING INK.—A German chemist gives the following recipe for copying ink: One ounce of extract of Campeachy wood dissolved in about five gallons of hot water, with the addition of a quarter of an ounce of crystallized carbonate of soda. When the solution is completed, add an ounce of ordinary glycerine of commerce, of specific gravity 1.25, fifteen grains of neutral chromate of potash dissolved in a little hot water, and a quarter of an ounce of gum powdered and reduced to mucilage by means of a little water, the whole mixture to be well stirred together. This ink is said to keep good for an indefinite time in closed bottles, to have no effect on steel-pens, and to copy well, even after the writing has been done for a considerable time. It has this peculiarity, however, that it will not copy by pressure. The method is to moisten the copying paper in the usual way, lay it upon the writing, cover the former with a sheet of smooth writing paper, and rub the latter with a paper-knife, using a moderate amount of pressure.

FIRE ANNIHILATOR.—Some experiments were made at Berlin a few days ago with a new fire annihilator, from the works of Shaffer and Budendurg, in Buckaw, Madgeburg. The whole apparatus is so portable that a man can carry it on his back with ease, and retain the free use of his hands for the direction of the current of gas. The charge consists of tartaric acid and the bi-carbonate of soda; in short, it is an effervescing draught on a large scale, and the carbonic acid gas evolved produces the desired effect. Two large piles of wood were covered with various combustible substances, and then ignited. After they were in full blaze, one man

extinguished both of them in two minutes with the same charge. After this, six boxes full of tar were set fire to, and filled the surrounding space with a dense cloud of smoke. One man extinguished the whole of them in one minute. Herr Scabell, the Director of the Fire Brigade, now had his turn. A scaffold of boards was covered with tar, and set on fire. A powerful jet of water was directed upon it, and extinguished the flames in a very short time; upon which the firemen gave a loud cheer. This of course was only natural, but if one man with a portable engine can act with only one-quarter of the efficiency of a fire-engine with a pair of horses and a dozen men to work it, there is no doubt that the former has gained the victory. The general impression was that the new invention would be of invaluable service in theatres and manufactories, or in towns and villages which cannot support the expense of a regular fire-brigade. In short, the new annihilator appears to be a great improvement on Mr. Phillip's invention, as it is at once more powerful and more handy to work.

MANUFACTURE OF ALUM.—For converting commercial muriate of potash into sulphate, Mr. Peter Spence, of Newton-heath, Manchester, proposes to take the muriate of potash, and heat it with an excess of sulphuric acid, and, by preference, this excess should be about fifty per cent. above its combining quantity. The boiling or heating is conducted in a vessel similar to that which is used in the manufacture of chlorine from hydrochloric acid and peroxide of manganese, the heating medium being a jet or jets of steam, and the operation is continued from three to five hours, or until the whole of the muriatic acid is

driven off. The resulting solution, which now contains sulphate of potash and free sulphuric acid, he runs into vessels where shale or other aluminous matters are being or are to be boiled with sulphuric acid, and the free acid in the said solution becomes available for combining with alumina, and the sulphate of potash enters into combination with the solution of sulphate of alumina to form alum, as is well known.

FANCY COLORING OF METALS.—On the Continent, as well as in England, the coloring matter of small objects in metal has occupied the attention of manufacturers and chemists. M. Puscher, a German chemist, gives the following receipts for the application of sulphur to the purposes referred to. 1. A solution is made in the following manner: Dissolve four ounces of the hypo-sulphite of soda in a pint and a half of water, and then add a solution of one ounce of acetate of lead in the same quantity of water. Articles to be colored are placed in the mixture, which is then gradually heated to boiling-point. The effect of this solution is to give iron the effect of blue steel; zinc becomes bronze, and copper or brass becomes, successively, yellowish red, scarlet, deep blue, light blue, bluish white, and, finally, white, with a tinge of rose. The solution has no effect on lead or tin. 2. By replacing the acetate of lead in the solution by sulphate of copper, brass becomes first of a fine rosy tint, then green, and, finally, of an iridescent brown color. Zinc does not color in this solution; it throws down a precipitate of brown sulphuret of copper, but if boiled in a solution containing both lead and copper, it becomes covered with a black adherent crust, which may be improved by a thin coating of wax. 3. If the lead solution be thickened with a little gum tragacanth, and patterns be traced with it on brass, which is afterwards heated to

two hundred and twelve degrees, and then plunged in solution No. 1, a good marked effect is produced.

BATH FOR COATING COPPER, BRASS, ETC., WITH PLATINUM.—The following is given as the composition of a good bath for electro-plating metals with platinum: In a solution of chloride of platinum sprinkle finely-powdered carbonate of soda until bubbles of carbonic acid gas cease to appear; add to this solution equal quantities of glucose and sea salt, until the coating of platinum loses all blackness and becomes of the natural color of the metal. The advantage of this bath is that it may be concentrated to any degree, and thus maintained for a long time. The articles to be plated are placed in a pierced zinc receptacle, and the bath heated to about one hundred and forty degrees; after a few moments the articles are withdrawn, washed, and dried in sawdust.

THE CAPITAL OF ICELAND—Madam Ida Pfeiffer, in her most interesting notes of travel, gives us a pleasing description of that forbidding region whose very name is sufficient to ensure a verdict unfavorable to its social status—Iceland. The tireless traveller and most delightful of tour-writers gives us the following account of the capital of the frigid island in question. She says: "The dwellings of the rich are of wood, and built entirely on the ground-floor, with the exception of a single edifice, to which the high school now kept at Bassestadt is to be removed next year. This has an upper story. The Stiftsamtmann occupies a stone house, which was originally intended for a prison; but crimes are of such rare occurrence in Iceland that it was converted many years ago into a residence for this officer of the crown. Another stone house can

be seen from Reikjariök. It is the seat of the bishop, which lies surrounded by meadows, near the sea, at Laugarnes, about half a mile from the town. The church is barely large enough to hold a hundred or a hundred and fifty persons. It is of stone, with a wooden roof, under which is kept a library containing several thousand volumes. This church possesses a treasure which might well be envied by others of greater size and pretensions—a font by Thorwaldsen, whose parents were natives of Iceland; and although born himself in Denmark,

he seems to have been desirous to honor the land of his forefathers.

A. T. STEWART'S RETAIL STORE, New York, is the largest on this continent, and, indeed, we doubt if it be not the largest in the world. It now occupies the whole block, having four uninterrupted fronts, respectively on Tenth and Twelfth streets, on Broadway and Fourth avenue. It is constructed of iron, and is, as far as possible, fire-proof.

QUERIES AND RESPONSES.

ERASMUS.—Our desire is to bring the subject of School Construction prominently forward for the public benefit. For this purpose we have appealed to the Principals of all educational institutions, to forward us any information and critical remarks that may be of service. As yet there has been no response to our call; whether we will have any, is a question which, like the meaning of the silence, we are at a loss to solve.

F. T.—The plan of building on packed sand is unquestionably a good one. But the sand bed must not be less than four feet thick to carry a building of great weight, and the footing stones must be of dimensions adequate to the task they have to bear.

SIGMA.—Scales made of paper, being influenced by the temperature of the office, which of course varies in the twenty-four hours, cannot be reliable. Watch the paper on the drawing board laid away, and you will see what the action is. Ivory scales are the cleanliest and best.

THE SUEZ CANAL.—The latest advices with regard to the progress of the Suez Canal are to the effect that the Bitter

Lakes had been brought up to the level of the Mediterranean, and that Mr. Lopez had gone through the whole length of the canal in a steamer. The completion, however, of the rest of the works in time for the proposed opening on the 17th November, is still considered in some degree uncertain.

T. U., Louisville, Ky.—Concrete should have a *batter* on both sides to answer for the *footings* in foundations; but this is not found easy of accomplishment in all cases.


J. D. H., Warren Co., Ohio.—As to your question, "What is the latest and best method of putting on Slate Roofing now in vogue?" Our answer is:—Slating should be laid on *felt*, with not less than three inches overlap, and be secured with iron nails boiled in linseed oil. As regards your other question, "Do you recommend the seamless drawn brass tubes for Plumbing in preference to lead?" We answer that we do. Lead pipe is constantly swelling with the action of hot water passing through it, and in frosty weather is always getting into trouble. Brass seamless tubing is free from these proclivities, and therefore more desirable.

PLAY-GOER.—The strong arm of the law should be invoked in the awful case of theatre passages. There is a deadly certainty of wholesale tragedy in the event of fire occurring in any of our theatres. *Not a single one is safe!* It is questionable whether it be possible to construct a theatre which shall be exempt from the appalling consequence of actual conflagration, or even the mere cry of "fire." Thousands wedged into narrow passages, and all forming one confluence of human life forced to emerge from threatened destruction through two or three doors, (frequently less.) Danger is ever present where all is combustible, and fire is so constantly in use upon the stage.

QUOIN.—There are over one hundred architects in New York city, some of whom have a very large practice, and many a very small share. It is not always the most talented that is the most successful. Connection and confidence too frequently form the sole claim of a successful architect; and such are most generally jealous of all others, knowing how unfounded their own character for taste and ability is.

INQUIRER, Madison, Wis.—If the house in question is of two kinds of dressed stone, one used for the trimmings and the other for the walls, we would advise that which is used for the trimmings to be likewise applied to the purpose of the chimney caps, so that all may be in harmony.

L., Binghamton, N. Y.—We would advise you to use zinc, instead of lead, for securing your iron in stone. And, moreover, we would substitute zinc for lead in the painting of iron-work exposed to the atmosphere, to guard against the galvanic action which is known to influence lead and iron when in connection. The zinc negatives this destructive action. You are wrong in your supposition that zinc is not as permanent as lead. The oxides of each are equally permanent with their relative metals.

 Illustrating the article on Iron Cornices in this number there are but two designs given; the other two not being ready. In the December number we will give the remaining two. At the completion of the volume they will come together.

PUBLICATIONS.

THE PRACTICAL FARMER.—The October issue of this excellent rural monitor comes to us in an increased size of eight additional pages, making it in quantity, as in quality, one of the most useful and attractive of the admirable agricultural periodicals which we welcome to our editorial table. The number before us is filled with sensible, instructive matter, which must well repay subscribers for the insignificant yearly cost of such a valuable agricultural publication.

THE POLYTECHNIC.—Such is the title of a new aspirant to scientific journalism which makes its bow from under the wings of the Hensseler Polytechnic Institute, Troy, N. Y. It is a quarto of twelve pages of three columns each, neatly printed on good paper, and the matter in this first number is of practical interest, as far as it goes, to the engineering student. Amongst the most noticeable of the papers are an unfinished solution and demonstration of the long looked for "tri-section of an angle," and a letter from JOHN WILKINS, C. E., Troy, N. Y., claiming the original suggestion of the Atlantic Cable Telegraph three years and a half before Mr. CYRUS W. FIELD's name was heard of in the matter.

There is a sprightly column or two of scientific and

collegiate items of interest. And altogether the Polytechnic makes a good first appearance. With care and industry it will prove a very useful as well as interesting addition to our National Science journals.

—We have, since writing the foregoing, received No. 2, and find it increased to sixteen pages. The matter is terse and interesting; the editing of it is promissory of complete success. The conclusion of the article on the "Solution and Demonstration of the Celebrated Problem of the Tri-section of an Angle," is worthy of the attention of all mathematicians and lovers of science. The proof of the solution is complete.

MORGAN'S BRITISH TRADE JOURNAL.—The October issue of this capital publication is before us, and is, as usual, well filled with the most useful selected matter, including in its solid pages all the financial and commercial intelligence, market notes, and export prices current, making it a never-failing guide, as well as a correctly informed companion to the merchant, the trader, the mechanic, and the public generally. In this country it is not less desirable to the business man than in England, and no doubt needs but to be known. The place of publication is 42 Cannon street, London, E. C.



THE STATUE OF FREEDOM.

Crawford Sculpt.

L. Haugg Lith.

See Page 343.

THE
ARCHITECTURAL REVIEW
AND
AMERICAN
BUILDERS' JOURNAL.

MONTHLY REVIEW.

EIGHTEEN SIXTY-NINE.

THIS is the last month of another year's existence, and still the world moves round in its accustomed course, and youth advances hopefully to manhood — manhood unwillingly approaches to age—and wearied age looks forward to the grave. All things move, in nature and in art; man's mind is never still whilst life remains; and, whether it takes a progressive or a retrogressive course, it is ever in action, guiding and directing the mechanical powers we possess to the execution of its ideas, minute or magnificent.

In taking leave of this passing year we naturally look around at the wonders which have been wrought in its term of rotation, and feel convinced, as we do so, that our age has, so far, well played its part in the history of time.

The European continent has been brought within whispering distance to our own, and our own has been girded with iron, until its extremes may be said to meet. Distance is little more than a word that may yet be obsolete, for, where time itself is overcome, distance must vanish to the land of dreams.

ENGINEERING has the credit of effecting wonders. But, without the supporting influence of the progressive arts how unequal to the tasks, now happily performed, would that great science be. There is not a single mite of mechanic

thought which does not belong to the great labor of constructing works of wonderful magnitude and usefulness. He who first formed the *nail* gave an invaluable aid to the constructive art. But he who invented the machine by which the nail is multiplied, put into the power of the mechanic a facility which vastly extended his domain of usefulness, and added to the comforts of his fellow being. The nail is a little thing, yet what a mighty work it does. The thought which gave it birth may have been the emanation of a very finite mind; yet what an infinite labor has it accomplished! This one trifling fact may be a lesson of importance to many a too modest mind, proving, as it does, that each and every one has some mite to give, to make up the great treasury of science from which skilled labor seeks to draw the materials for those undertakings which so amaze us in their accomplishment.

SCIENCE and ART advance shoulder to shoulder on the track of time, and each assists the other on the intellectual march.

ENGINEERING pioneers the way for ARCHITECTURE, and brings into the circle of civilization new sites on which cities are to be reared and adorned.

ENGINEERING produces the ore; ARCHITECTURE refines it.

During the year Eighteen Sixty-nine

ARCHITECTURE has done much to prove its power in the great movement of civilization; and although tastes will differ as to the means, there can be no doubt but the end has been actively sought, for which all arts were formed—namely, the advancement of man's interest, his comfort, and even his ambition. All our cities throughout the Union have had their renovations and their reconstructions. New villages, that will at no distant day be cities, have started, like fairy fungi, from the ground along which that eighth wonder of the world, the Pacific Railroad, winds its way.

The expenditures of the materials market has not influenced the trade of building, as most of us thought it would, and streets prolong their length, whilst lordly piles are rising in the midst and holding up an example of improvement which is sure to be followed by all who delight in progress, and take a pride in the embellishment of their locality.

Discoveries of new and most valuable materials have been made; prominent amongst which is that of the native colored marbles which promise to add very much to the decorative capabilities of the great Building Art.

Invention has been at work in devising new ways and means of comfort for mankind, and the consequence is that individual wealth can to-day revel in what all the combined riches of our ancestors could not obtain in their time.

In fact invention prompts invention; and thus we progress in novelty *ad infinitum*.

The steady success of the ARCHITECTURAL REVIEW is a striking instance of the advanced condition of public taste in this country on the subject of BUILDING; for, it is not many years ago that the very word "Architect" was neither correctly pronounced, nor distinctly understood. In our largest eastern cities a very few professed to make designs; and in the best cities of the West the

poorest carpenter was recognized as an "ar-she-tect."

How great is the difference now. New York City alone has over one hundred and fifty professional Architects, some of whom do a most lucrative business. But it is only necessary to point to the improved and improving state of building, lay and ecclesiastic, throughout the land to show the progressive state of our art; and to remind the observer that even when the market for materials was half, or one-third, of what it now is, and labor proportionately low, people of means never thought of constructing such palatial edifices as are everywhere to be seen to-day, North, South, East, and West.

Yes, the year Eighteen Sixty-nine presents a pleasing view of the position occupied by Architecture in the great social advance of the times, and leads us on to the cheerful prospect of a promising future of growing interest, and increasing patronage.

A CORRESPONDENT of the *Sumter News*, writing from Long Branch, pays a well merited tribute to a Charlestonian whom he met on the steamer Saragossa a few days before. He says:

J. H. Devereux, the architect, commenced life at the early age of seven as a poor boy, working at the cooper's trade in his father's shop at Charleston. At nine he could make a barrel as well as any one. He soon developed talent as a mechanic and designer; went into the ornamental plastering business, and at eighteen set up for himself as a builder and contractor. At one time friends urged his father to let young Devereux go to Italy at their expense, but the old man took a more practical view, and preferred his son developing his talent in this, his native country. At first he struggled hard with the opposition of older men, but by dint of hard study and close application to his business, he is now at the head of his profession in Charleston.

ARCHITECTS' FEES.

TO the man who entertains a fitting respect for his profession, nothing is more important than the maintenance of that respectability which is recognized in the prompt acknowledgment of his full claim to a regular standard of remuneration for his services. Now, it too often happens that young practitioners will give their time and mental labor for a mere trifle, for the sake of obtaining business; and this degrading practice tends to drive others to the same course; for, the building public will not pay one man more than another for doing the same work, providing the cheap man does it as satisfactorily. For this we can, of course, find no fault with the building public. Every one will try to save expense where he can. The practitioner in question is alone to blame; and there is no excuse for his conduct; for he not alone injures the profession generally, but the very act he has been guilty of recoils on himself. The established Architect, having heavy office expenses and consequently requiring large business, is driven to the necessity of *undercutting* his young cotemporary; and, having his name already made, will very easily succeed in driving him to the wall; for experience is more readily paid for than first effort, notwithstanding the desire of wealth to be considered liberal and philanthropic. What then has been gained by this reduction of charge? Clearly, nothing—Architects' fees are now too low and cannot afford to be diminished.

Let any one consider what the Architect's labor is, and he will soon find out that of all the professions it is the worst remunerated, for the amount of value given.

He has to keep suitable offices; retain draughtsmen of ability; appear well and mix much in society; be

always ready to render gratuitous services to any religious denomination that shall need them, and expect much annoyance and no thanks therefor. All this together with the never-ending trouble and worryment of mind connected with superintending the proper execution of his various designs, inclusive of the rectification of blunders on the part of certain mechanics who did not understand his specifications, or could not comprehend his details and yet pretended they could. The meeting and soothing the angry feelings of clients who have complaints to make; and finally, the settlement of the whole, and getting over that curse of all contracts, the "extras," which *will* creep in unbidden, and make themselves disagreeably manifest.

And again, the hurry of clients to have their designs got ready, and the delay they themselves are thoughtlessly guilty of in not giving their commission until the very last moment, and consequently leaving no time to fittingly digest the requirements of the plans, and give due attention to the details. The occasional discovery of discrepancies as the work proceeds, and the nervous excitement attendant on such discovery, causing restless nights and painfully thoughtful days. All these troubles and trials has the Architect to endure; (and the more extensive his practice the greater are these annoyances) And for such his fee is but a small remuneration, compared with that given to the doctor or the lawyer.

A painter (landscape or portrait) has no calculations or estimates to make, he simply works on with his brush, dependent on no assistant, and knowing and feeling how his work is coming out. He receives full compensation for his genius, without any objection. But the Architect, whose labor of mind and body

is so incomparably greater, is expected to be *most reasonable* in his charges.

There is positive injustice in this matter, and much of the fault of it lies at the door of the Architect himself, who does not set a sufficient value on his genius, his labor, and his mental efforts, which so surely bring on nervous excitement, with all its train of sufferings.

London Architects, in first rate practice, have long since come to the

conclusion that *five per cent.* is not sufficient remuneration for their services.

American Architects should insist at least on what is just and fair; and if all the profession would abide by the decision of the Institute of American Architects, and not deviate from that, the building public would respect them more and be less inclined to seek to degrade them by the offer of inferior fees.

ARCHITECTURE A SCHOOL STUDY.

IT is most unaccountable that educators and the friends of education will so obstinately close their eyes and ears to the claims of ARCHITECTURE to be made a branch of school study. That they do so is certain: their reason for such apathetic inaction is not so certain.

We repeat, it is most unaccountable, why this distaste for such a study should exist; but, exist it does. The consequence of such neglect is painfully evident in the acknowledged ignorance of nine-tenths of the community of the simplest principles of the noble art which great men have delighted in, and Solomon, the wisest of kings, studied to the glory of THE MOST HIGH; THE SUPERINTENDING ARCHITECT OF ALL.

We have yet to see in a Report of a School Board any allusion to this subject. Although it must be well known to all, that the want of such a study is felt, and that it is as much entitled to attention as one-half of the studies so cared for, by those who claim to form the growing mind of the rising generation.

So bigoted are the mass of instructors against the claims of ARCHITECTURE as a science worthy of general attention, that they will not take the trouble to inform themselves in it; and, of course, cannot be expected to recommend it to the public as worthy of a place in the general stock of information. They

seem to look upon it as a mysterious art, which they have as little right to perplex a pupil's mind with as though it were astrology or even the theory of medicine.

ARCHITECTURE is an ancient and a very clearly defined science. Its history involves that of the human race. Its principles are those of Nature and Art combined. It includes almost every branch of human knowledge. It is intimately allied to taste; and no study has more interest attached to it than this most wontonly neglected of sciences. Painters on canvas affect to despise it, and declare that *it is not one of the Arts*; although Michael Angelo gloried in it; Raphael revelled in it; Giulio Romano extensively planned in it; and Domenichino, Paul Veronese, and Pietro Cortona practiced and delighted in it.

Who can look upon the choicest works of Claud and not acknowledge that he made ARCHITECTURE his study, and had well weighed its best principles in his peerless compositions.

Why, then, is this study refused admission to our schools? We do not demand that it shall be thoroughly taught therein, but we do claim that it has a right to recognition at least, and that a primary knowledge of it is as necessary as of Chemistry, Astronomy, or even History itself.

DRAWING is deemed an accomplish-

ment, and is partially, very partially, patronized by the educators; as if it were not as useful, almost, as writing. How many men to-day would be glad to convey their ideas in drawing that they cannot satisfactorily depict in words, written or spoken? They may be counted by millions! Many of them have been taught to outline maps. Oh, what an absurdity to waste time on such paltry work whilst the simple art of outlining a stone, a bench, a house, is viewed as an *accomplishment*, an *extra of education*!

It is not very many years since Writing itself, the most useful acquirement next to Reading, was made a special study in our common schools, and that it is fearfully neglected, even now, is patent to every editor in the land who receives much "correspondence." But it *is* taught, and why, because public opinion forced it on the educators. The want was too palpable. Private Writing Academies were flooding the land; and the young men who had left public school "finished" in their education had to attend them, and pay their extravagant "terms." This could not last—and it did not. These young men became fathers, and knowing their own wants, insisted on a change; and now a professor of Writing attends to each school.

Will it not also be the case with Drawing? And not alone that, but even Architecture, in its primary dress at least, be admitted to our public schools?

Have not the people a desire for an acquaintance with an art that so attracts their notice on all sides. Not a scientific knowledge—but a simple acquaintance; an amount of information sufficient to satisfy their natural curiosity as to the principles which govern the construction that calls forth their pleasure or dislike? Certainly they have, and it is only the apathy of educators that keeps them in ignorance.

Does not the man who proposes to build a house feel seriously the want

of that knowledge which compels him to accept at the hands of his Architect any design which may suit the taste of the latter, although not agreeable to his own natural judgment? He feels a desire for something he cannot describe, and in his helplessness throws himself blindly on that which is presented to him with the assurance of its being most suitable; yet he is not suited, and never is contented with his house.

Of course, many people are easily led to accept any design which the Architect they place confidence in declares in accordance with their wants, and the fashion of building then prevailing. Criticism of such design is doubly disagreeable to them, because of the very weakness or want of judgment on their part which led them ignorantly to become accountable to public taste for it.

All this annoyance could most easily be averted by the inculcation at school of such little primary knowledge on the subject of Architecture as would enable the future man to form a fair judgment in such matter; and those educators who wilfully withhold so simple a boon from the rising generation are unworthy to partake in the formation and enlightenment of the minds which they assume to control.

It may be urged that there are no school books suitable to the first studies in Architecture within the reach of the student. How long would such an excuse be valid, if superintendents of schools only hinted a desire on their part to introduce the study as a branch of education? Publishers would soon be enabled to fill the chasm; and that with books most desirable for the purpose; prepared, not by loosely informed amateurs, but by experienced and educated Architects.

Will not the educational periodicals throughout the country take this interesting subject in hand? A time will come when ARCHITECTURE shall be a school study. Why not anticipate its coming?

FIRE ESCAPES.

THE loss of five lives in a recent fire in New York has once more aroused public attention to the fearful state of danger existing in the present reckless inattention to safeguards against the outbreaks of that dreaded element of destruction. This last tragedy ought to have the desired effect of arousing the people, not alone of New York, but of every city in the whole Union, to a sense of the danger which constantly overhangs them.

First amongst the places that most require particular consideration in this regard we place those barrack-like tenement houses in which New York is, of all cities, the most interested.

Second to these in consideration are hotels and large boarding houses.

In the third class we would name theatres, concert rooms, lecture halls, and places of nightly public assembly generally.

The first and second *risks*, as we will call them, are the more dangerous, from the fact of their being sleeping-places, where, in the most helpless state, during the lonely hours, poor, unthinking humanity is left at the mercy of chance or accident, to meet the most horrible of fates.

Those tenement houses and hotels are generally six or seven stories high, and the approach to their upper floors is indeed a labor fully equal to the ascent of Mont Blanc, or the stairs at Niagara Falls. Then what must the descent from such a height be when impelled by the maddening fears of swift destruction by surrounding flames! In that perilous moment there is no time for deliberation; frantic terror deprives the mind of reason, and always impels to the most unfortunate alternative.

Numerous *fire escapes* have been proposed, but not one of them that we

have seen was perfect. Many were good in the quiet daylight, when those who tested them were in the cool possession of their senses; but it is quite a different matter when fear has driven the senses away, and nothing but horror surrounds one.

Iron ladders clamped against the wall, are worse than useless, because they are deceptive; giving the appearance of an escape, without the reality. How could a terrified, weakly woman come down from a fifth or sixth story on one of these narrow things? And in freezing weather how could they be used at all by men or women? The poor children are not to be thought of in calculating the utility of these iron ladders; unless carried down they must inevitably perish!

Those iron balconies, which have been accepted by the Inspector of Buildings in New York, are, it seems to us, wholly inadequate to the task of life preservation; for, the windows which give access to them, as well as the windows beneath them, will also give a chance to the flames to pursue the victims who huddle for safety on these human gridirons.

It is a most difficult study, this of perfecting the means of preservation of life from fire; and yet it is one which makes such a demand upon us, on the score of philanthropy, that we find it absolutely necessary to tax every energy of the inventive faculties to secure some reliable means for its accomplishment.

The stairway being the well known place of egress is decidedly the most eligible location for any means of escape. No matter how bewildered the unfortunate is, he will seek the stairway almost by intuition. That, then, being the most likely place of refuge, should be capacious and perfectly fire-proof; having a free and easy passage to the out-

side, without being obliged to encounter rushing flames whilst escaping.

The walls which enclose the stairway should be thick and well constructed, and the stairs themselves should be of iron or stone. All doors leading directly on to the staircase should be iron; and in fact not a particle of inflammable material should be used in connection with this medium of escape.

This stairway should be so designed as to become at once excluded from the other parts of the building; and to this end it would be necessary to cut off all open halls and passages. As our houses, hotels, and tenement buildings are now constructed, it must be obvious to every mind, that the stairway with its open landings and connected halls and passages, is a perfect gangway for the devouring element; as well as being a free conductor of cold in winter, rendering it most difficult to fairly warm a building. Thus we see that in any case the present open stairway and its accompaniments is a misconstruction, and should, in our day of progress, be so reformed as to become an auxiliary to comfort rather than an obstacle to its attainment.

The transition from "fire escapes" to "fire-proof buildings" is so easy and so natural that we find ourselves verging on the latter whilst endeavoring to advocate the perfection of the former. Our main object at present is to throw out suggestions which may prove of use to those who will take hold of this vital subject with an honest intention of rendering the human family a service by protecting life from the most awful of all destroyers.

WATERPROOFING WALLS.

One of the most recent of the many uses to which Mr. Frederick Ransome's process of manufacturing artificial stone has been applied, is in protecting the

outer walls of buildings, so as to enable them to resist the action of the weather by making them waterproof. Through well-built and substantial walls, moisture will make its way, and the ordinary type of dwelling house is very pervious to wind-driven rain. We recently noticed what Mr. Ransome is doing in preserving stone, and his system of waterproofing is only an application of the same process.

The external surfaces of the walls to be protected are first washed with a silicate of soda or a solution of flint, which is applied again and again, until the bricks are saturated, and the silicate ceases to be absorbed. The strength of the solution is regulated by the character of the bricks upon which it is to be applied, a heavier mixture being used upon porous walls, and a lighter one on those of denser texture. After the silicate has become thoroughly absorbed, and none is visible upon the surface, a solution of chloride of calcium is applied, which, immediately combining with the silicate of soda, forms a perfectly insoluble compound, which completely fills up all the interstices in the brick or stone, without in any way altering its original appearance. By this operation the wall is rendered perfectly watertight, and, as the pores of the bricks are thoroughly filled for a considerable depth from the surface with the insoluble compound, which is entirely unaffected by atmospheric influences, no subsequent process is necessary.

Already Mr. Ransome has successfully applied this process to a large number of buildings, several of which were previously almost uninhabitable from the constant dampness, and a lengthened experience has proved that it is not only thoroughly effective, but, from the comparative insignificance of its original cost, and the fact that renewals are never required, the system recommends itself for general adoption in preference to all other methods of waterproofing.

DESCRIPTIONS.

UNITED STATES NAVAL HOSPITAL, ANNAPOLIS, MD.

J. McARTHUR, JR., WM. S. ANDREWS, AND R. W. PETERSON, ARCHITECTS.

THIS building is now under contract, and will be pushed forward to completion as rapidly as consistent with the soundest and best of construction. It will occupy a portion of the ground on which the United States Naval Academy now stands, and will be a most desirable addition to the national buildings at Annapolis, Maryland.

The chief materials used will be stone, brick, and wood. The trimmings, window and door sills and caps, will be of smooth dressed stone; the belt courses, area steps, copings, etc., to be of stone. The front portico, veranda, eave cornices, cornices around Mansard roof and dormer windows, the cupola, &c., will be of wood, painted and sanded in imitation of stone. The roofs will be covered with slate and tin respectively. The steep portions with the former, and the flat portions with the latter.

All the stairs and landings will be of cast iron, except those of the cupola, which will be of inch thick yellow-pine steps and white-pine risers. The hand-rails will be of plain walnut and the balusters of hard-wood.

The steps from the verandas will be of ash, or yellow-pine plank, screwed to iron horses, and without risers.

All the window frames will be made reveal, white-pine boxes, with pulley stiles, parting strips, bead, etc. All the sashes double hung. Inside rolling blind shutters to fold against the jambs without boxes, to be hung to all the windows of the first and second stories, and to the attic windows of the centre building. Also to the windows in the basement, except under the wards. All

to be hung on butt hinges and have bronzed fastenings, etc.

The corridors and halls of the attic are to be lighted by dormer windows at the ends; hung so as to open and close by means of cords.

All the doors throughout the building will be made of the best white-pine. The front door frame, the side entrance doors, back and front, and doors at the extreme ends of wings, will be made of three inch plank.

The inside finish around all the windows is to be two inch wooden bead nailed on to the edge of the jamb casing, and to lap over on to the plastering thereby covering the paint. The jamb casings to be of inch white-pine tongued into the window frame. The window sills one and a quarter inch thick, finished with nosings and scotia, and a five inch wide plain fascia.

The architraves around all the doors of the basement and attic, the water-closets, bath-rooms, etc., and on the entresols or half stories, will be three and a half inches inside, and be moulded. Around the doors of the first and second stories will be five inches wide moulded architraves, all mitred at the angles, and finished down to the floors.

All the doors and windows will be furnished with mortice locks and mineral handles.

Bronzed bell-pulls will be used for the entrance doors in front, and the front doors will have bronzed handles or knobs. All the window shutters will be furnished with the most approved bronzed brass catches.

Bells and speaking tubes will be con-



ACCEPTED DESIGN FOR THE U. S. NAVAL HOSPITAL.

JOHN Mc ARTHUR, JUN^R
W. S. APPENDIX



FIG 4.

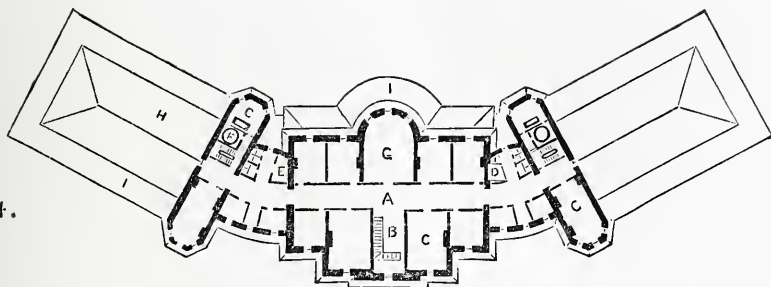


FIG 3.

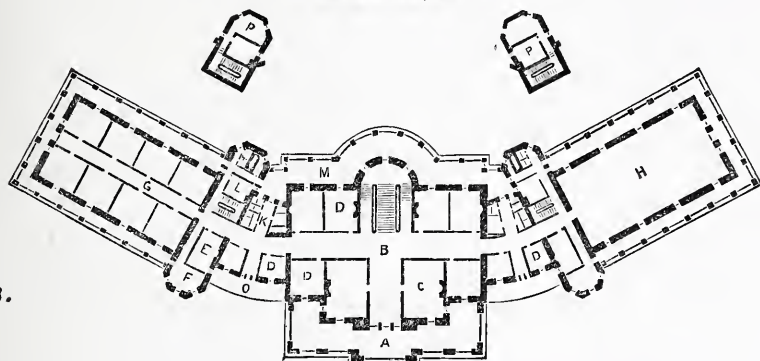


FIG 2.

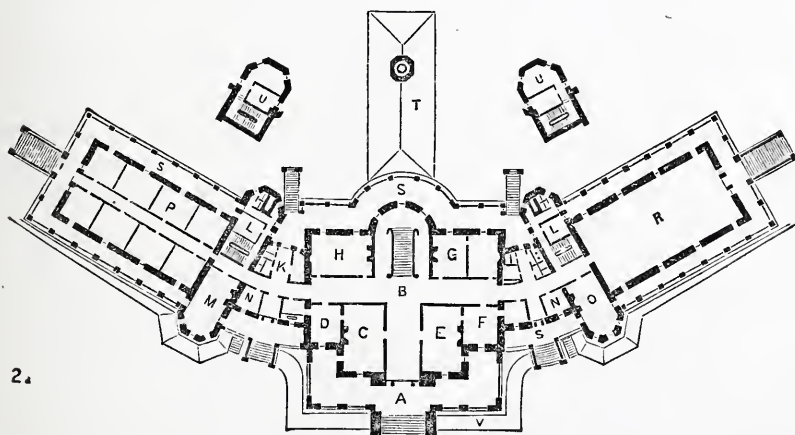
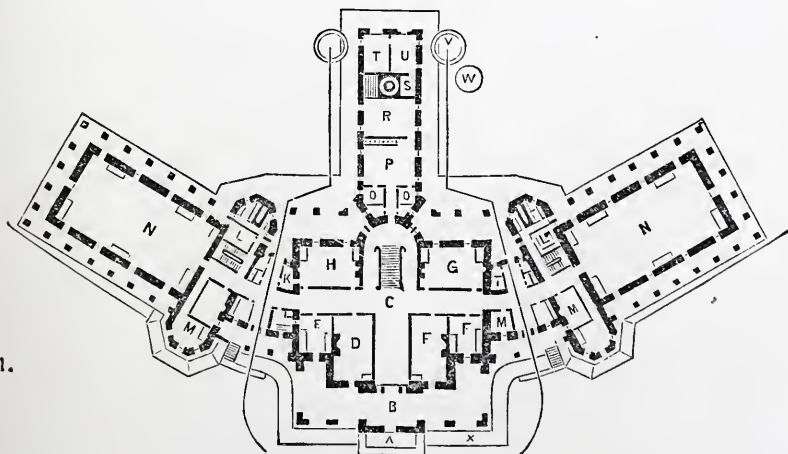


FIG 1.



veniently placed. Every dumb-waiter and hoist on each story will be furnished with speaking tubes and signals. The whole building will be amply furnished with gas light.

Six copper lightning rods running from a secure point within the ground to the highest points of the building, and tipped with the best platina points, will be effectively fixed for the security of the building.

A twelve horse slide valve steam engine will be set up, with a No. 2 Woodward's steam pump, with metal valves, and all the necessary steam and water connections and valves, and so connected as to feed either one or both boilers, as required.

A No. 4 Woodward's steam pump will be set up in the engine house and be connected with all steam, exhaust, and waterpipes necessary to supply the building.

A ventilating fan, eight feet in diameter, will furnish a continual supply of fresh air through the main air duct to all the coil chambers. This fan will be connected with requisite shafting and belts to the fly-wheel of engine.

The coils will consist of fourteen thousand five hundred feet of one-inch wrought-iron heating pipes, divided up in box coils, constructed with manifolds, with the requisite number of outlets, etc. Each of these coils will be connected to the main steam and exhaust pipes. The main hall to be heated by direct radiators covered with cast-iron screens and marble slabs.

The Kitchen will have a large cooking range with two ovens, four tin steamers for bread, puddings, vegetables, etc. Two twenty gallon copper kettles tinned inside and entirely surrounded with a steam jacket, having all necessary valves and connections for steam and exhaust pipes. Two fifteen gallon double kettles for tea and coffee. Each of the above will be set on a cast-iron stand with wrought-iron legs and screwed firmly to the floor. Each will

be properly connected with the summer steam pipe; as will also the vegetable steamers before mentioned.

The Laundry will be furnished with four wash-tubs, supplied with hot and cold water. Washing mill (Shaker patent) and a No. 2 centrifugal clothes-wringer. These will be connected by shafting pulleys and belting with the fly wheel of the engine. There will also be a drying closet furnished with eight clothes horses running on iron tracks. Each of these will have a coil of steam pipe connected with the summer steam main.

Two wrought-iron tanks, each seven feet in diameter and six feet deep, connected with feed pipe, will supply all the water pipes throughout the building.

Besides this supply there are to be wells of fresh water dug on the premises, convenient to the steam pumps, from whence water may be distributed to the different points of the building where required.

The Hospital will be complete in all its parts and be a credit to the Medical Department as well as to the professional ability of its architects.

The following is a reference to the letters found on the plans:

BASEMENT PLAN. FIG. 1.

A, Fuel vault. B, Area. C, Hall. D, Servants' room. E, Superintendent's kitchen. F, Steward's room. G, Seamen's dining-room. H, Midshipmen's dining-room. I, Elevator. J, Dumb-waiter and closet. K, Pantry. L, Store-room. M, Rooms. N, Cellar. O, Closet. P, Kitchen. R, Laundry. S, Fan-room and ventilation. T, Boiler-room. U, Engine-room. V, Cisterns. W, Condensed steam cistern.

PRINCIPAL FLOOR PLAN. FIG. 2.

A, Porch. B, Hall. C, Reception-room. D, Surgeon's dining-room. E, Surgeon's office. F, Dispensary and Apothecary's room. G, Surgeon's apartments. H, Officers' dining-room.

I, Elevator lavatory, etc. K, Pantry, etc. L, Diet kitchen. M, Midshipmen's sitting-room. N, Nurses' room. O, Seamen's sitting-room. P, Midshipmen's chamber. R, Seamen's ward. S, Verandas. T, Kitchen roof. U, Store-room. V, Terrace.

SECOND FLOOR PLAN. FIG. 3.

A, Balcony. B, Hall. C, Officers' room. D, Officers' chamber. E, Nurses'

chamber. F, Sitting-room. G, Midshipmen's ward. H, Seamen's ward. I, Lavatory, etc. K, Bath-room, etc. L, Diet kitchen. M, Veranda. O, Roof. P, Sitting-room.

THIRD FLOOR PLAN. FIG. 4.

A, Hall. B, Staircase. C, Bath-rooms. D, Elevator, etc. E, Closets. F, Cold water tank. G, Chambers. H, Roof of ward. I, Roof of veranda.

DESIGN FOR A SPIRE IN DETAIL.

WE have received applications for advice as to the best mode of constructing spires for churches, and promised to give the requisite information as soon as the illustration we deemed necessary should be engraved. To elucidate the subject, then, we call particular attention to the accompanying cut, which shows the section of a spire, displaying in the one drawing the naked framing; and in the other a half section, and half covered view.

The spire is supposed to be constructed of wood and covered with slate; that being the usual method followed throughout the country. In large cities, however, they are now-a-days constructed of stone, as in Europe.

Stone is, of course, the more costly, but eminently the most fitting in an architectural sense. Its durability also is a set-off to its greater expense; and this latter virtue has weight even in those localities where desirable stone is scarce, and consequently expensive. It has been the custom to shingle or clap-board spires, and such a mode of covering is not altogether uncommon even now, in vicinages where lumber is cheap and slate difficult to be got.

There is to be taken into consideration in the constructing spires covered with wood in any shape, the expense of painting, which, owing to the necessity for high scaffolding, and the difficulty

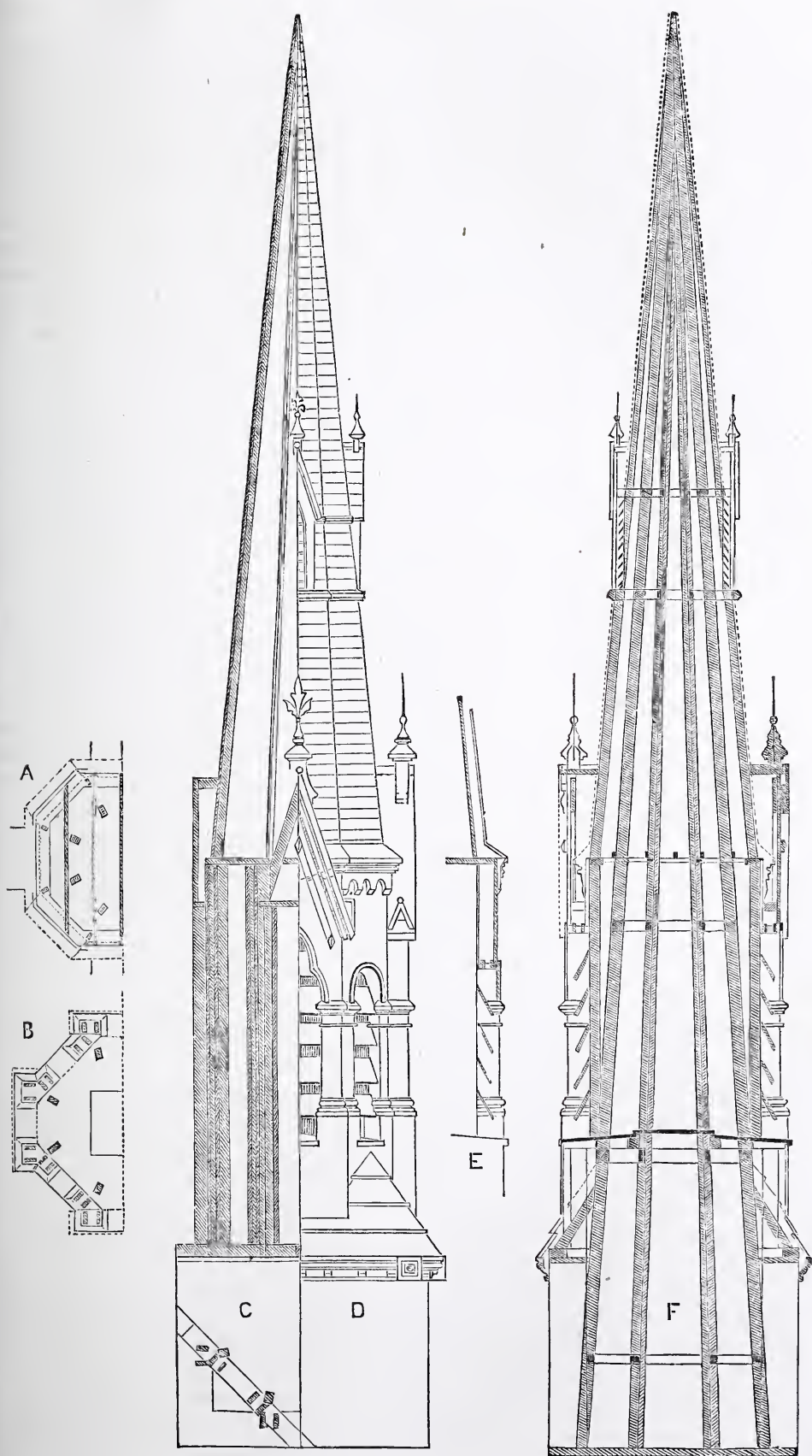
attendant on the putting up and securing of the same, must be considerable.

The first cost of these modes of finish is decidedly then in favor of slate, provided it can be conveniently had. This material requires but little preparation to prepare it for use, and can be cut into any shape. Slates can be varied in color as well as in figure, and beautiful effects can be produced in such covering of spires. All woodwork that may be necessary should be of slate color. The crowning ornament, or finial, gilded.

The construction of such spires is very simple; for, the form tapering, every stud or piece of timber becomes a brace, and all are easily secured together.

We will now proceed to point out the best mode of putting together such spires.

First, form a core of four upright pieces. Sometimes (as in the example here given) eight pieces. All of these must extend down into the tower at least one stage, say from twenty to thirty feet, according to its height. The core timbers should be spread out at the bottom as wide as the space enclosed by the tower walls will permit, and have the full thickness of the timbers sunk into the wall, where they should bear on the cross-sills, and to which they should be securely bolted, and have straps of iron in the form of stirrups.





The core timbers are always cut with a taper upwards. Their usual size, for an ordinary spire, is $8'' \times 8''$ at the bottom, and $5'' \times 5''$ at the top, where they are clamped together with a ring, and have cross-pieces framed into them at intervals of from twelve to fifteen feet. The splicing, which is always necessary where the required height is greater than the timber can be obtained in single lengths, should be done by splintering the joints on two sides. The splinter to extend, say from four to five feet past the joint, and be about three inches thick, by the width of the post. The splice must be firmly bolted with five-eighths inch bolts. The joints requiring no more than a step-mortice crossing from splint to splint.

The shell of the spire is composed in all cases of eight uprights of about $6'' \times 6''$ at the foot, and $4'' \times 4''$ at the top, and reduced to the requisite size for the top ornament. Those are strapped at the top like the core. The timbers which compose this shell are set on the top of the tower walls on the plates that are placed there for that purpose; and well secured together at the ends with cross-ties, bearing on the top, bolted to them. Those ties are

placed at the sides of the core timbers, and are also bolted to them. By this means the whole spire is firmly braced together at its base, with occasional braces between the shell and the core timbers. The exterior to be close weather boarded, with tongued and grooved boards, preparatory to slating. The weather boarding to be coated with felt, and all trimmings well flushed with tin. A water-tight floor should always be laid at the top of the tower to avoid leakage from drifting snow and rain, that might be driven through the louvre windows.

A, is a horizontal section at the base of the spire, showing the core and shell timbers, also the cross-ties that secure these together

B, is a section through the base at the bottom of the windows, showing the furring timbers, etc., that form the projections for the windows.

C, is the one-half, showing the naked timbers.

D, is the other half, enclosed and prepared for slating.

E, the vertical section through the window.

F, a full section, showing the whole timbers, to the bottom of the core.

DESIGN FOR A COUNTRY RESIDENCE.

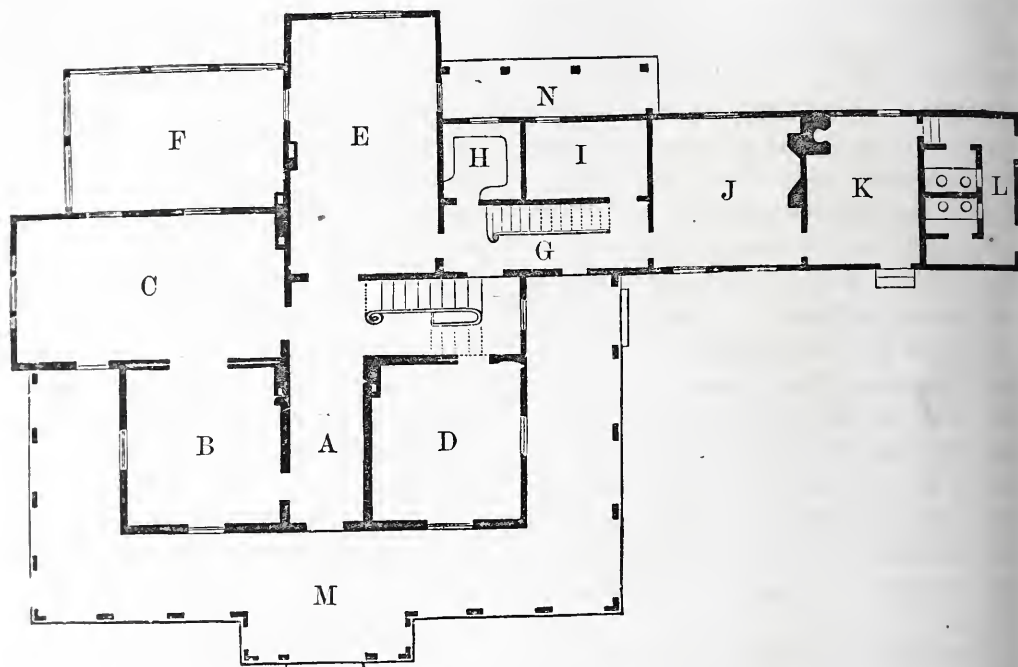
CLOSE on the banks of some bright mountain stream that falls into a river within view, seated on a picturesque rising ground, just such a villa residence as the following engraving represents might stand. There are hundreds of sites as well adapted to such a style, throughout the States; and hundreds of as likely villas that stand in need of such another scenic surrounding.

As regards the residence itself it is one of comfortable convenience and elegance of appearance, well suited to elegant taste and liberal retirement.

The plan of the first story contains A, the Hall, eight feet wide and eighteen feet long to where it connects with the inner, or stair hall, which is nine feet wide and twenty-six feet long, with a flight of commodious stairs, easy of ascent and well lighted on each story. These two halls are separated at the junction by two fluted columns, having corinthian capitals and broken entablature, with an arched head.

B, is the Reception parlor, eighteen feet square.

C, is the Drawing-room, seventeen



FIRST FLOOR.

by thirty, communicating with each other by sliding doors.

D, is the Library, eighteen feet square.

E, the Dining-room, seventeen feet by thirty feet.

F, the Conservatory, eighteen by twenty-four feet, in communication with the drawing-room and dining-room by glass doors.

G, the Passage from dining-room to kitchen; which also contains the private stairs. It communicates with the main hall, thus giving a free passage from the kitchen to the front door.

H, is the Pantry, which is also entered from the private passage, and could readily be made to have direct communication with the dining-room, if desired.

I, is the Store-room, nine feet by twelve. Large store-rooms are always desirable in country houses where greater quantities are provided at one time than is the case in cities.

J, is the Kitchen, seventeen feet square.

K, is the Wash-room, twelve by seventeen feet.

L, Shed, with earth closets, or commodos.

M, a Porch, extending around three sides of the main building.

N, Veranda, approached from the dining-room.

The second story contains eight chambers, (A.)

B, is the Hall and the landing of the main stairs; having a private stairway leading to the observatory.

C, is the Passage and landing of the private stairs, having a large linen closet at one end.

D, is a Store-closet for heavy clothing between seasons.

E, the Bath-room, fitted up with all the modern conveniences.

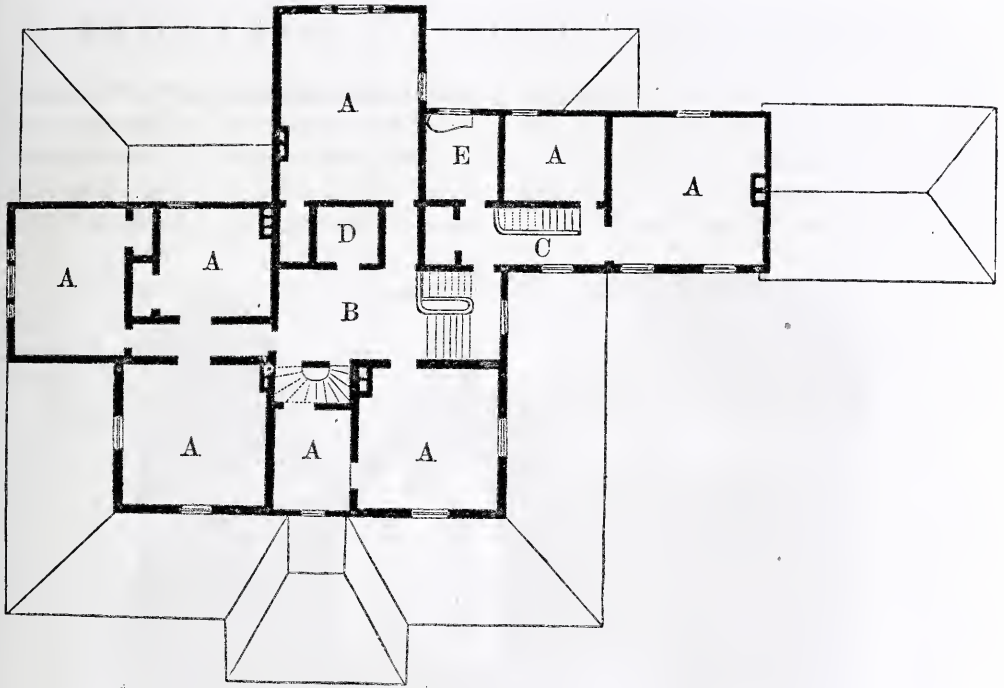
This story has a good supply of commodious closets.

Flues are so located and arranged as to amply supply the whole house with heated air from furnaces situated in the cellar.

The walls are intended to be constructed of stone. There will be a cellar under the whole house.

The roof to be covered with metal:





SECOND FLOOR.

An enclosed observatory occupies the centre.

The porches are all of wood, including the ceilings which may be finished smooth, and oiled. Stained to any desired shade.

The dressings throughout the interior should all be of soft pine, and painted white, except the Library and Hall, including the stairs, which should be walnut, oiled without varnish. All the doors throughout the first story of the main building should be stained walnut, and also the window sashes. The trimmings of the Dining-room may readily be of oak, Carolina pine, or white ash. But the doors in either case will be of walnut.

White is the most desirable coating for the second story, except in the Bath-room, which should be of hard wood and oiled.

The furniture of all the walnut doors should be of either bronze or silver plated. The second story knobs, etc., of white porcelain.

The mantels should all be white, ex-

cept those of the Library, which might be of colored marble of a light tint.

The glass of the principal rooms, on the first floor, should be of French Crystal sheet. The rest of best American. All should be well bedded in putty.

The exterior walls should be furred out to receive the lath and plastering, and the ceilings of the principal rooms should be cross-lathed with shingling lath, to avoid the too usual cracking of the plaster.

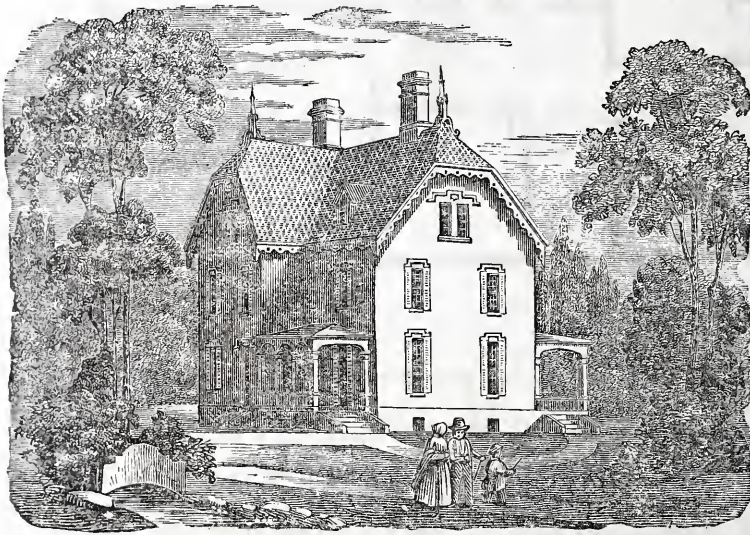
A dwelling of the foregoing dimensions and design, if erected in a locality convenient to the required materials, and built in accordance with the general description here specified, can be erected and finished complete for eighteen thousand dollars, (\$18,000.)

A BRASS DOOR, weighing 1456 pounds, and costing \$840, has been manufactured in England for the Wolf Rock Light House, to replace a solid oak door four inches thick, shattered into fragments by the force of the waves.

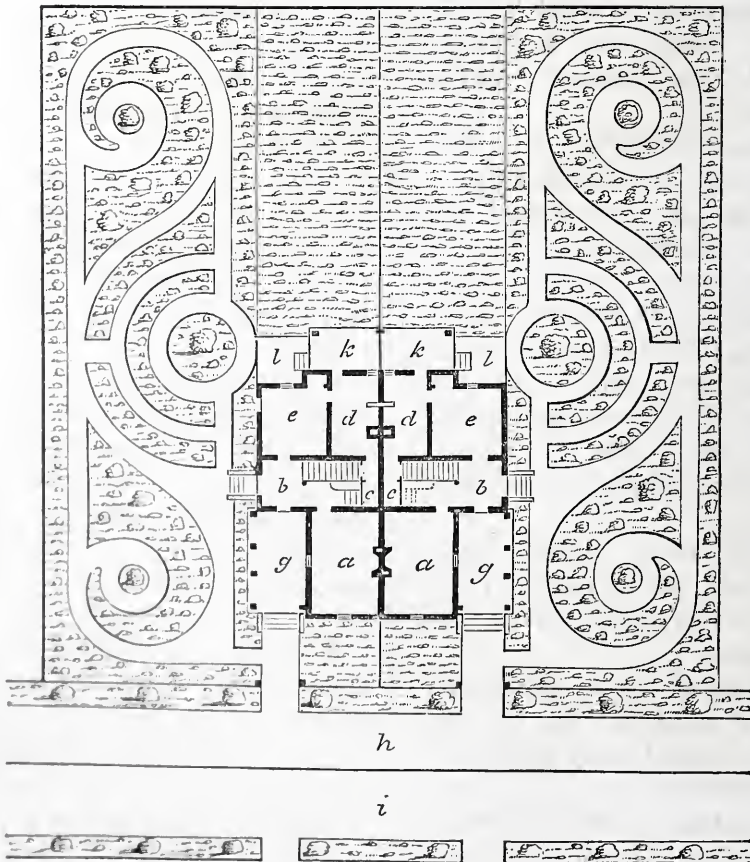
DESIGN FOR DOUBLE COTTAGES.

NO less desirable than double suburban houses of the villa capacity are the combinations of cottages for a like purpose, namely, *effect*. Singly they would be trifling—united they

form a pleasing composition which gives a certain character to this mode of building that renders it very desirable in an artistic point of view. There are other advantages to be found in its



DESIGN FOR DOUBLE COTTAGES.



PLAN FOR DOUBLE COTTAGES.

adoption, no less acceptable than that—namely, economy and comfort. The economy is to be found chiefly in the roofing and the chimneys. The comfort consists in the concentration of warmth and the mutual protection from the weather.

Each of these cottages is well adapted to the wants of a small family of moderate means; and as the two will occupy the one lot, of fifty feet front by one hundred feet deep, the combination doubles the benefit to be derived from the garden space.

G, is the side porch, from which it might occasionally be desirable to enter the hall. A neat stained glass window could be substituted for the door at the end.

The Second story has three chambers, and the Attic has two, all of a fair size and well adapted to the location of furniture. There is a bath-room over the front end of the hall.

Double cottages like these and of the same dimensions, finished in a neat yet respectable style, constructed of stone painted, or of brick painted, can be



DESIGN FOR SUMMER HOUSE.

The building front should be placed back, say fifteen or twenty feet, from the sidewalk, so as to afford a chance for a display of taste in ornamentation with flower beds, shrubbery, etc., according to the taste of the occupant. A bleaching patch of grass may be placed in the rear, as such in household economy is always desirable.

Each cottage contains three rooms on the first story, namely—Parlor, A, 12×16 feet, a stair-hall 7.6 wide, which is also the entrance. On the rear is the Dining-room, E, 12×13 feet, with china closet and a Kitchen, D, 10×15 feet. K, is back Porch; and L, a paved Walk.

erected for, say four thousand dollars or two thousand dollars each.

Not less than three hundred dollars should be added for fencing and decorating the grounds.

In connection with this design, and desirable in any ornamentation of grounds, the following summer house will prove useful.

It is to be constructed of wood neatly carved, and put together in a workmanlike manner. The floor may be of ornamental tiles or inlaid with vari-colored woods.

The whole should be stained and varnished, not painted.

BOIS DE BOULOGNE.

PORTE DE PASSY.

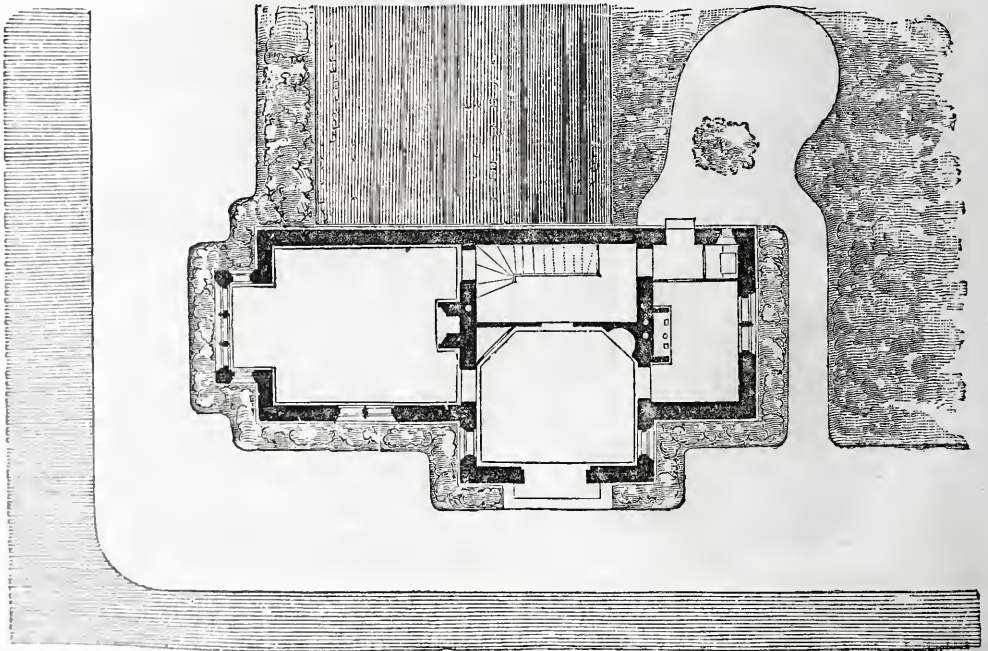
WE present this month to our readers another of those attractive gate-lodges of the Bois de Boulogne, not so very novel in appearance in our land of overreaching cornices and projecting roofs.

These little dwelling pavilions, as our Gallic friends style them, (*Pavillons d'habitations*,) are similar in their appropriate use to the porter's or gatekeeper's lodges of an English demesne. There are nineteen of them placed at the en-

colors, maintaining a uniformity of appearance under every diversity of design.

The accompanying plan shows the simple arrangement of the interior, with its sitting-room, bed-room and cooking department. The surroundings of these pretty pavilions are always ornate with flowers and shrubs, and carefully kept grass-plats as skirtings to trim entrance walks.

Such a work as this, from which we extract those little gems of art, should



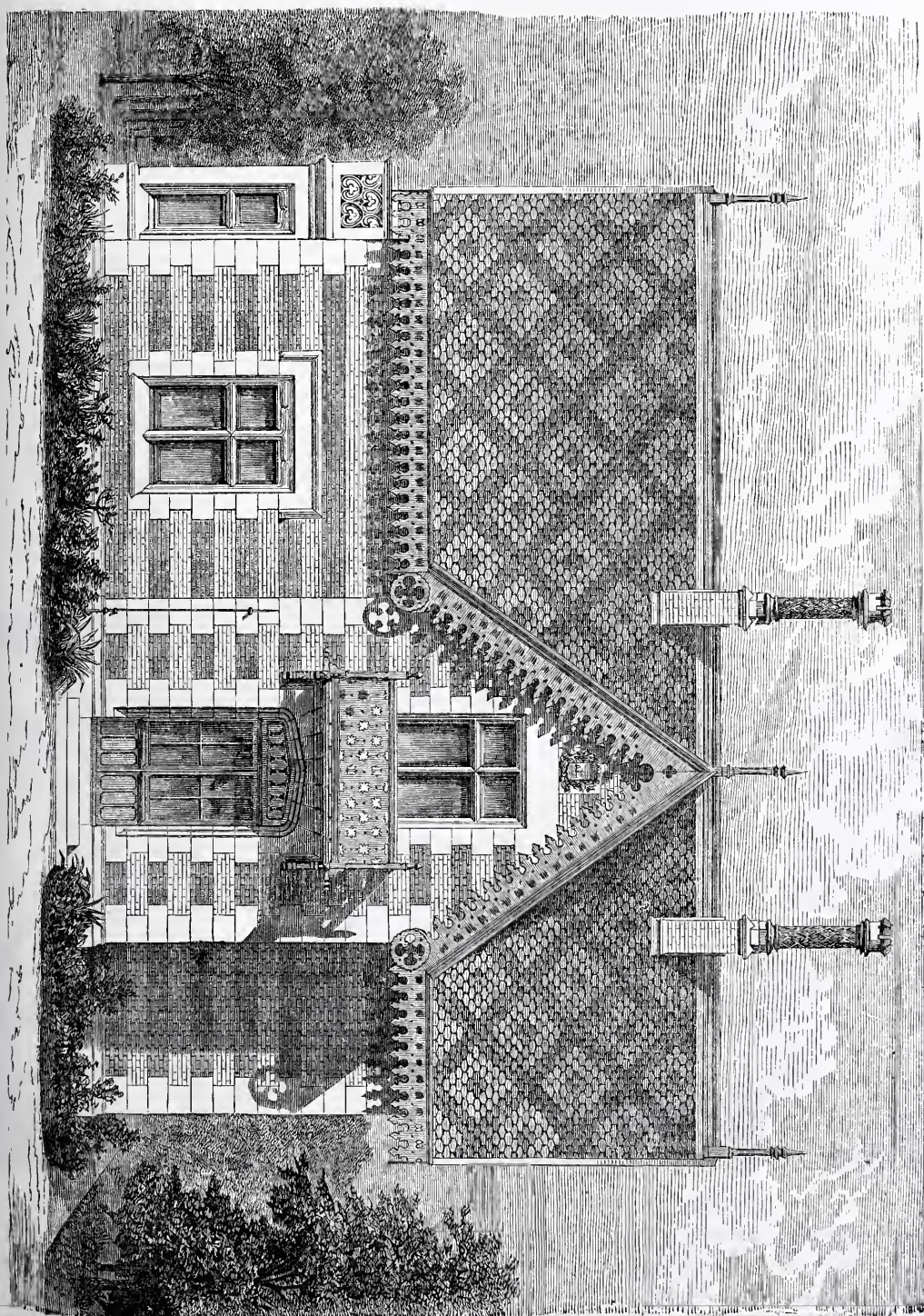
trance of the Bois and in the caserns constructed at the interior of the promenade.

These pavilions may be classed in six sections, of which the specimen before us ranks as No. 5.

The models adopted for these pavilions differ in plan one from another, although there is yet a strong resemblance in style throughout, resulting from the employment of similar materials in all of them. Thus, the façade is invariably composed of face-brick, disposed in horizontal bands of two

be in the hands of every lover of landscape gardening, every engineer who has charge of our public parks, and every gentleman of means who desires to enjoy in a fair demesne and its fitting surroundings that elegant ease which his successful industry has justly rewarded him with. For, though we boast not of a landed nobility, bound by the guardian chain of primogeniture, we can and always will behold in this country the broad spreading parks and gardens of our millionaires.

M. ROTHSCHILD'S great work, LES



PROMENADES DE PARIS, is making itself known in this country, and must become eminently popular. As we before hinted, this magnificent work would indeed prove an art-treasure in any library or boudoir, were it even for the exquisite finish of its engravings which really sparkle on the superb paper on which

they are printed. Who that has seen Paris would choose to be without this bright remembrancer? Who, that has not ocularly enjoyed the brilliant sights of that capital of the Beau Monde, would fail to take advantage of thus becoming acquainted with its brightest beauties of Nature and Art?

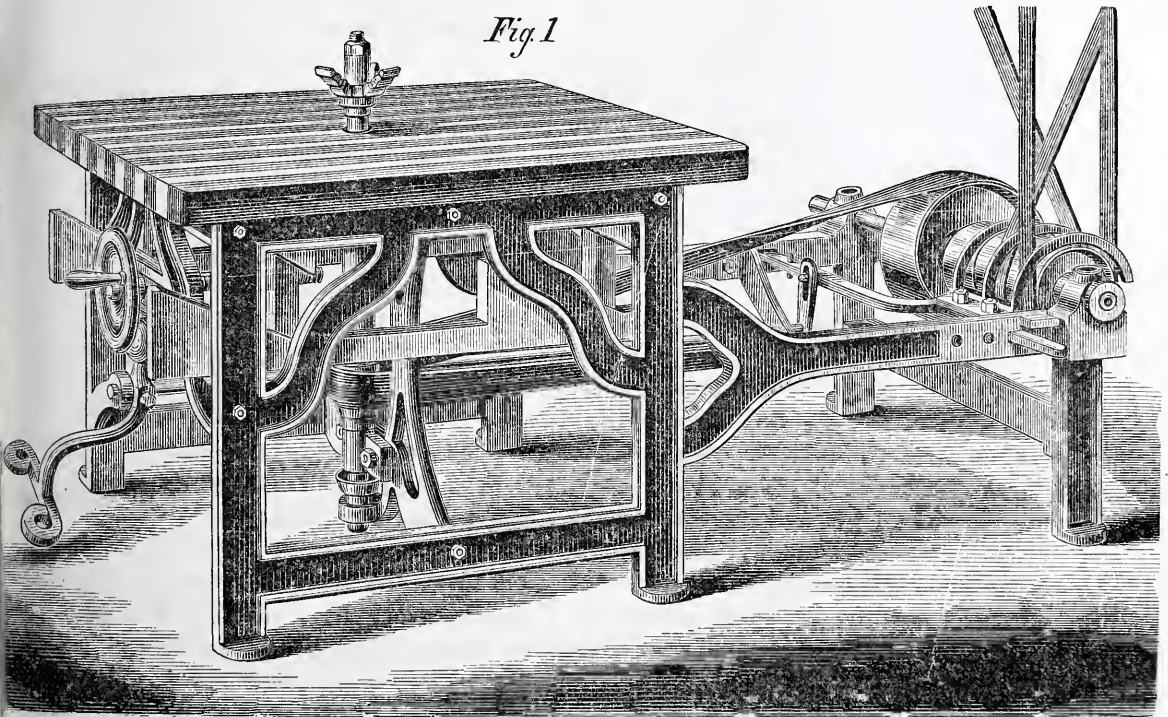
ROTARY MOULDING CUTTER.

THERE are few machines more desirable, both for rapid and perfect work, than that which is known as McKinley & Mellor's improved patent Moulding Machine.

not be attained by our ancestors, save with constant labor and tireless industry.

There is apparently nothing too difficult for it to accomplish, and it is beyond all question a thorough worker,

Fig. 1



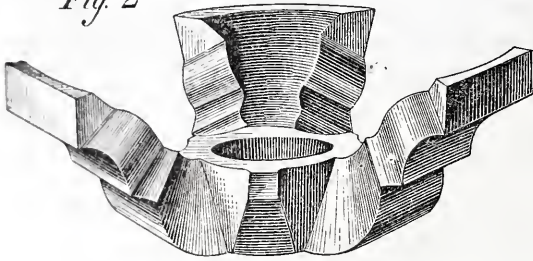
Nothing that has been introduced for the last quarter of a century affords the carpenter and joiner more complete control of the most difficult branches of his art than that machine. With it all kinds of circular and fancy sawing becomes comparatively easy, and the interior finish of dwellings is now brought to that pitch of perfection which could

fully capable of getting out all kinds of irregular, circular or elliptic mouldings. It will run right or left, so as to cut with the grain of the wood, and is therefore especially adapted to the making of window sash mouldings.

Such machines are of incalculable benefit to Architecture, for they facilitate the perfect execution of design,

and give a confidence to the designer arising from the assurance that what he composes can be carried into effect cheaply, expeditiously, and well.

Fig. 2



This illustration shows the form of the cutter.

TWIN DWELLINGS.

THE perspective of the two adjoining dwellings which we here present, gives a fair idea of the pleasing effect which can be produced by this mode of construction. The bays are bold and distinct, giving style to the exterior, and room to the apartments in which they occur.

The arrangement of the plan of this design is one that cannot fail to prove satisfactory, where ease of access, sufficiency of light, heat, and ventilation, are the chief requirements. The parlor, library, and drawing-room, being *ensuit*, and connected by sliding doors, ample room is easily had for the reception of a large party of guests on festive occasions, as well as rendering the house particularly pleasant in the warmer summer days, when air is invaluable.

The walls are sufficiently wide to give comfortable passage way, and the principal and private stairs well calculated to give easy access to the upper floors; the servants' rooms being cut off from the main chambers.

The material of which these dwellings may be constructed is stone; although pressed brick with stone dressings would

look very well. Stone, however, is the more elegant material, and will, when well executed, add much to the appearance as well as permanence of the design.

A bold Mansard roof crowns the composition; and this, at the entrance front, rises higher than that on the main part of the building.

The Mansard roof adds greatly to the general effect, besides giving a sufficiency of head-room in the attic chambers, a characteristic of this French style of roof which will always make it most desirable in house construction.

The dormer windows are trimmed in an ornate manner, and, with the moulded eurls and rich cornice, tend to make the broad face of the Mansard, with its vari-colored and fancy-shaped slating, an object of especial interest.

The accompanying reference describes the plan:

A, is the Vestibule, with the entrance on the side next the porch.

B, is the Hall, with the main stairs.

C, the Parlor, 14×20, with bay window on the side.

D, is the Library, 14×14.

E, the Dining-room, 16.0×26.6, with octagon end.

F, is the Passage, with private stairs.

G, is the Kitchen, 11.0×16.0.

H, is the Butler's pantry, 7×3, ×6.6.

I, China-closet, 4.0×7.3.

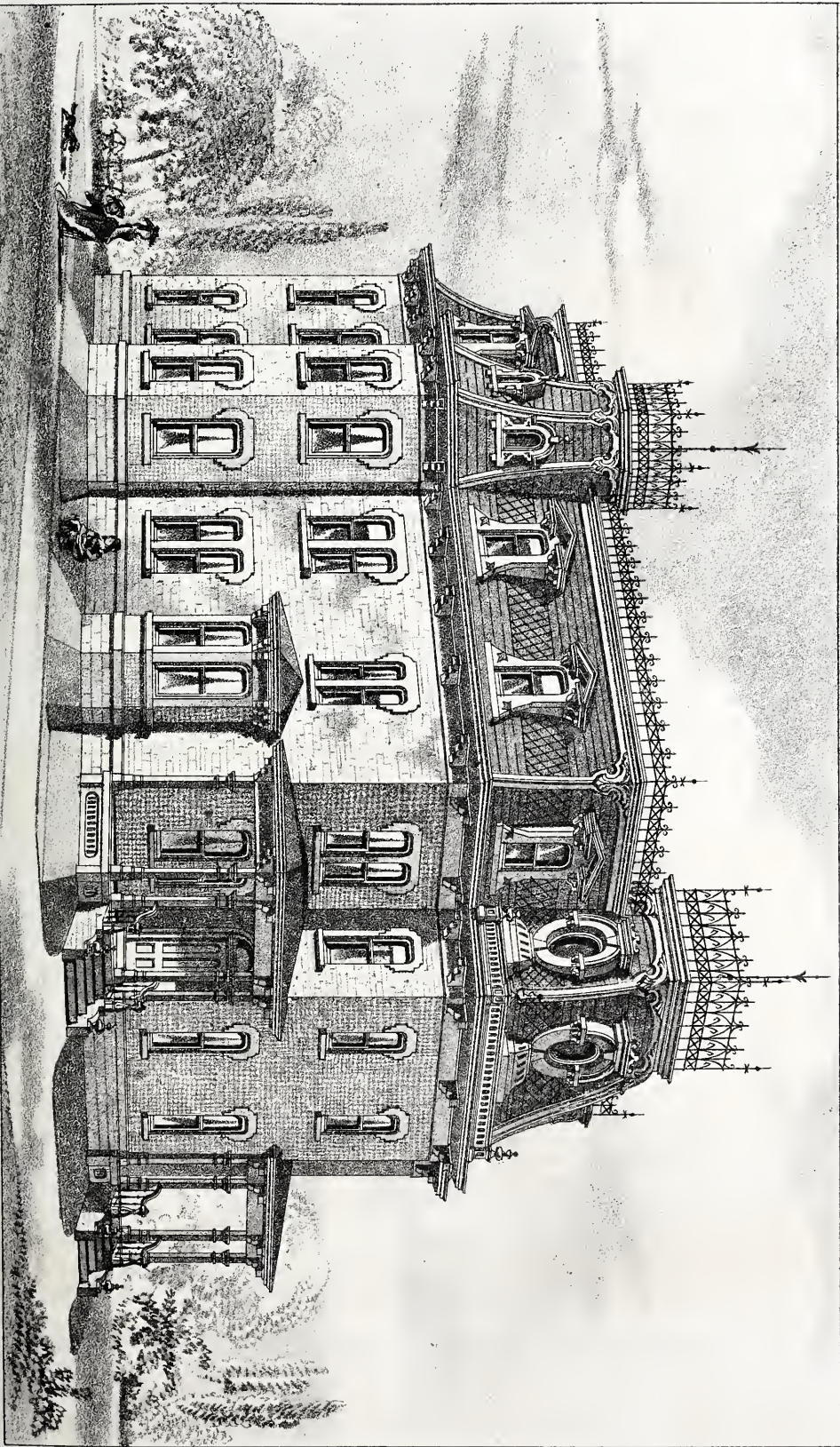
The second story is cut up into five chambers (A), all of moderate size, having ample closet accommodation to each; a most desirable characteristic of a dwelling.

B, is the main Hall and Stairs.

C, is the Passage, with private stairs.

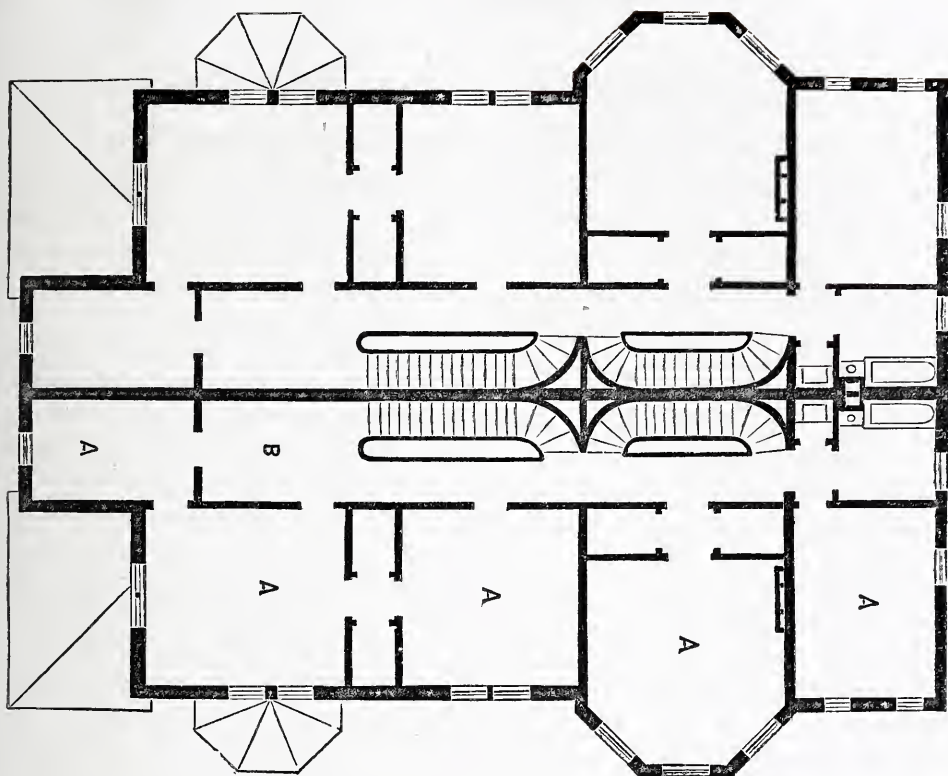
D, is the Bath-room, fitted up with all the moderate conveniences.

The other story is arranged similar to foregoing, with a Store-room in the place of the Bath-room.

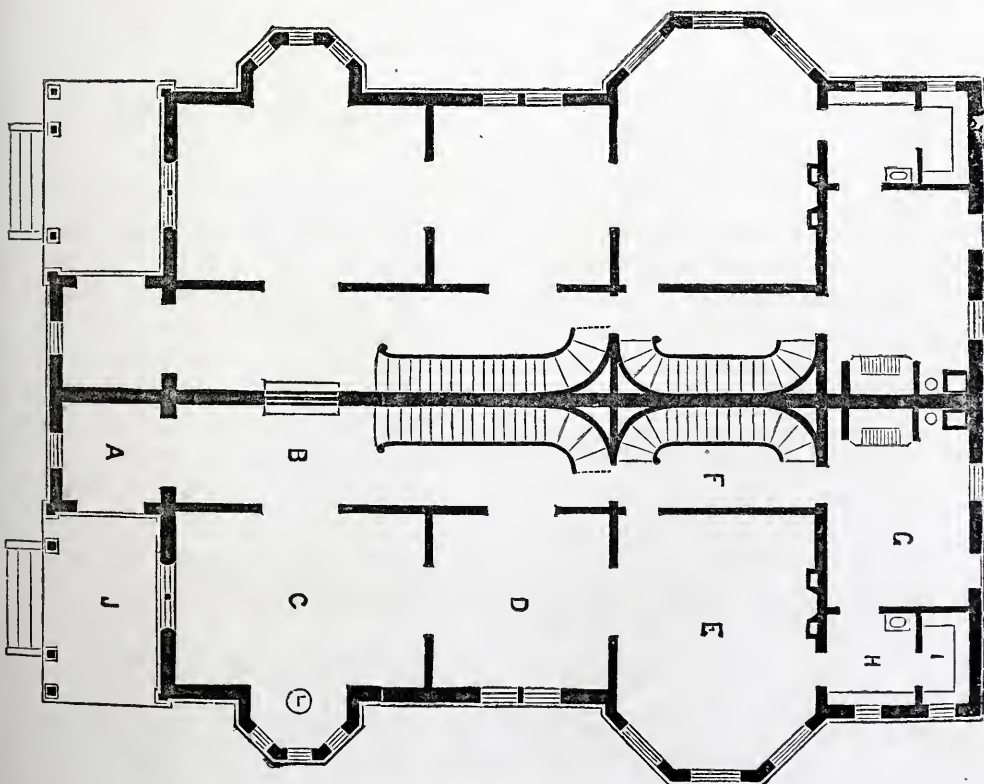


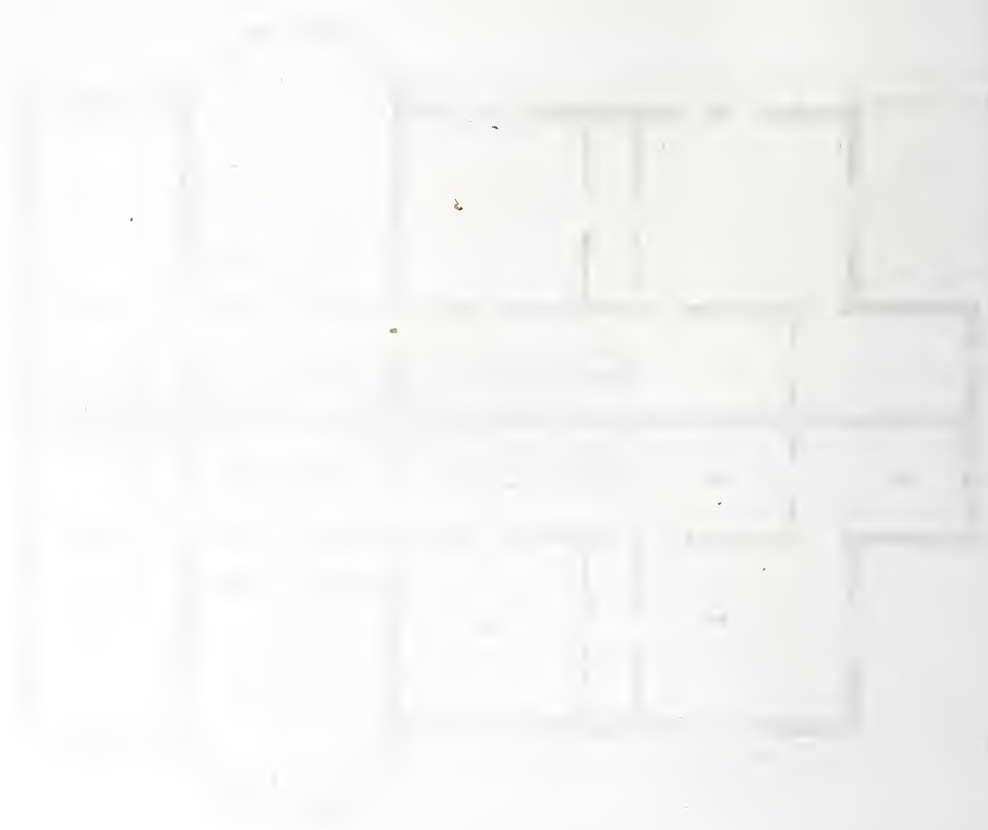
DESIGN FOR TWIN DWELLINGS.

SECOND STORY.



GROUND PLAN.





THE ROOSEVELT HOSPITAL.

LAYING OF THE CORNER-STONE—DESCRIPTION OF THE BUILDING.

THE ceremony of laying the corner-stone of the Roosevelt Hospital, in Fifty-ninth street, between Ninth and Tenth avenues, took place October 29th, forenoon. An awning was raised over the platform, which had been erected around the stone, and under it about sixty persons gathered to witness the ceremonies. A procession was formed in Ninth avenue, and entered the hospital grounds in the following order:

The President of the Hospital.
 Trustees of the Hospital.
 Building Committee.
 Committee of Arrangements.
 Architect, Master Mechanics.
 Clergy of the City of New York.
 Presidents of Columbia College,
 New York University and the College
 of the City of New York.
 Alumni of Columbia College.
 Professors and Officers of Medical Col-
 leges.
 Officers of the Chamber of Commerce.
 Medical Staff of the several Hospitals
 and Medical Colleges.
 Trustees and Members of other Institu-
 tions.

On the arrival of the procession the Rev. Thomas De Witt opened the ceremonies with prayer, after which several articles, such as pamphlets, the New York Directory and the Herald were placed in a copper box, and put in the niche of the corner stone. The box was then sealed, and the top portion of the stone lowered over it, whereupon Dr. Delafield touched it with a small mallet, and concluded a few remarks by expressing the hope that centuries might pass by ere the contents of the stone would be again seen by mortal eyes. The Rev. Joseph T. Duryea then made a very elaborate address, during which he spoke of the founder of the institution as an exemplary Christian, and a man who

always made it his ambition to go about doing good.

THE SITE

Of the new hospital could not have been better selected. It covers the whole area of ground bounded by Ninth and Tenth avenues and Fifty-eighth and Fifty-ninth streets, and is just opposite the splendid buildings which belong to the Paulist Fathers. It will be remembered that the funds for the establishment of this hospital "for the sick and diseased, without regard to race, color or religion," were provided for in the will of James H. Roosevelt, who died in 1863. The will when admitted to probate, it may also be remembered, was for a long time the subject of much litigation in the courts.

THE HOSPITAL BUILDING

Will be on the pavilion plan, with an administrative building in the centre of the block, and two pavilions on each side. In the rear of the administrative building will be the engine and laundry building, having an ornamental chimney one hundred and twenty-five feet high on one side, and a shaft for fresh air, sixty feet high on the other. There will also be a mortuary building, containing a pathological museum, post-mortem examination and coroner's inquest-rooms, etc.

The principal entrance to the hospital will be in the centre of the block in Fifty-ninth street, through the administrative building, which will contain the office, apothecary's room, chemical laboratory, superintendent's offices, etc. The engine and laundry building, in the rear, on Fifty-eighth street, will contain the general kitchen, laundry, engine room, bakery, etc., with servants' apartments in the second story. The boilers will be situated in vaults under ground, and detached from the building, so that the inmates cannot be injured.

Each of the four pavilions will be one hundred and seventy feet long by thirty feet wide in the central part forming the wards, and fifty-six feet wide at the front on Fifty-ninth street, where will be the physicians' and nurses' rooms, linen and bath-rooms, ward kitchens, etc. The wards will be thirty feet wide, ninety-three feet long, and fifteen feet high, and are arranged for twenty-eight patients, giving to each patient one thousand four hundred and ninety-four cubic feet of space.

Ventilating shafts are to be built at each end of the wards, which will operate with other flues in the wards in carrying off the foul air. Three different modes of ventilization will be used. First, by natural ventilation; second, by drawing the foul air to the large chimney connected with the boilers, and thirdly, by forcing a continuous supply of fresh air into every part by means of a fan, which draws it from the air shaft. The lavatories, supplied with vapor baths, shower baths, basins, etc., are to be situated in the Fifty-eighth street end of the pa-

vilions, separated from the wards by wide passages. Numerous baths, etc., will also be provided in other parts of the building. The main stairway (which is to be built of stone and iron, and entirely fire-proof,) will be at the Fifty-ninth street end of the pavilion. The basement, under the large wards in the first story, will be divided up into an ophthalmic, children's and accident wards, and smaller rooms, for delirium tremens', patients' clothes rooms, etc. The floors will be connected by a large elevator and dumb waiters. Dust flues will be provided for conveying the dust from each floor to the cellar. The buildings will be heated by steam, and ventilated in the most approved manner. The hospital, when completed, will accommodate from two hundred and fifty to three hundred patients.

By the terms of Mr. Roosevelt's will, the management of the hospital was left to nine trustees, who, according to a resolution adopted by themselves, serve without compensation, as will their successors in office.—*N. Y. Herald.*

LESSONS FOR LEARNERS.

THE next step in our progressive course is one which demands close attention and committal to memory, for few subjects come under the eye of the mechanic which require a ready knowledge more than this which we now put before our readers—namely,

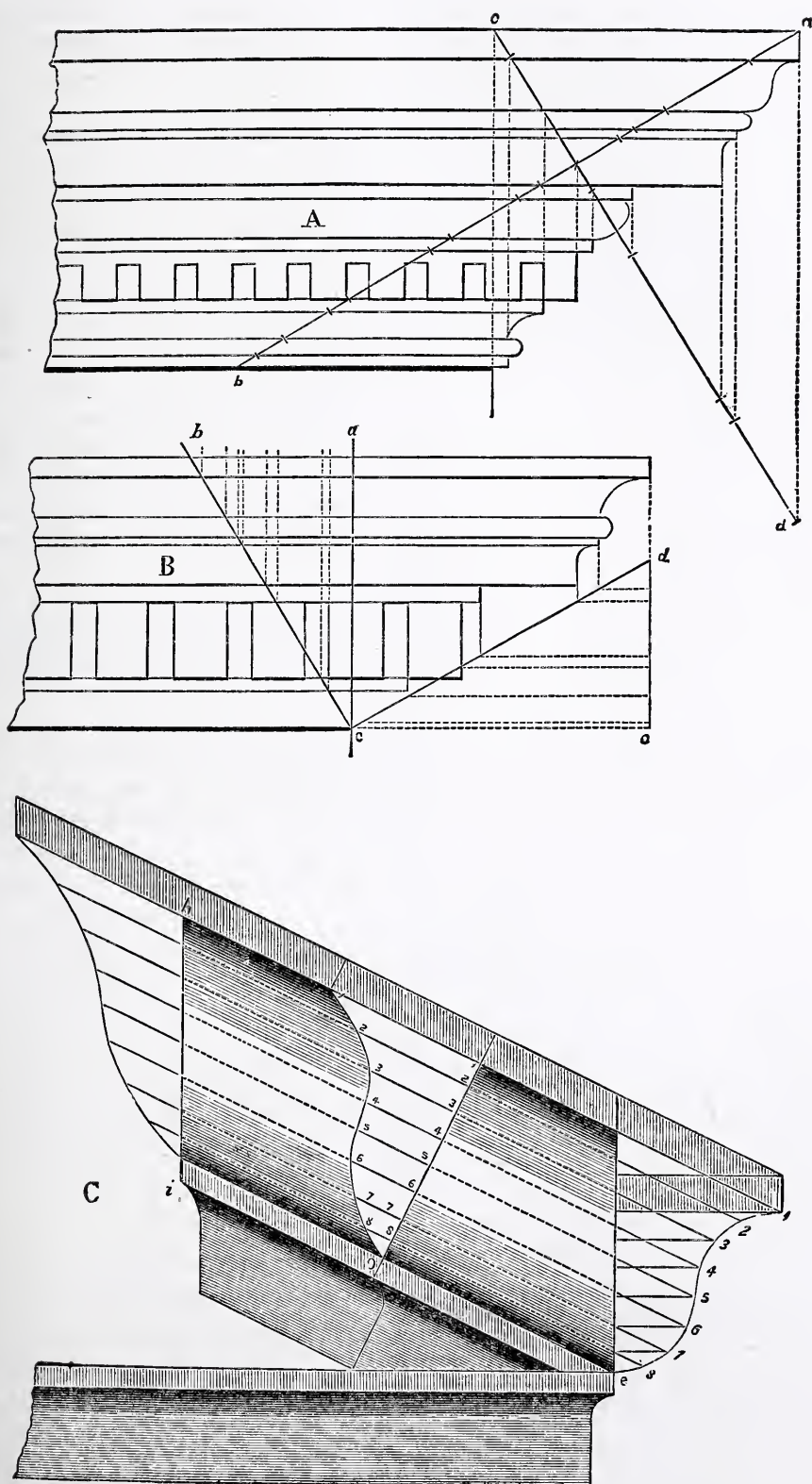
ENLARGING A DRAUGHT OF A CORNICE.

Fig. A, in the accompanying plate, shows how to get the points of the increased draught, as thus:

Let the line *ab* be the height to which it is required to enlarge the cornice. (Of course this line can by its inclination be made to any required length, and consequently be made to answer for any height of proposed cornice.)

Wherever this line crosses the different members of the draught, mark it, and these marks will give the height of the different members of the enlarged cornice. It is very plain that the erection of this line into a perpendicular position, and the squaring off of lines through the several points marked, will give the several members their due proportion in the increased draught of the required cornice. This illustration also shows the method of finding the projection enlarged in proportion.

From the point *c*, which must be directly over the line of the front of the wall, draw the line *cd* at right angles or square with the line *ab*; on this line square over the projection of the dif-



ferent members of the draught, and that will give the projection required.

Fig. B is the method of contracting a draught.

Let $a b$ be equal to the height of the cornice required; from b draw the line $b c$, and where that crosses the different members of the draught, draw lines perpendicular to cross $a b$; which will be the height proportioned.

To find the projection, contracted in proportion:

From c draw the line $c a$ at right angles or square with $b c$; then draw down the projection of the draught on this line; and from this line carry them square out to the line $d e$, which will be the projection contracted in proportion to $a b$.

How to find the form of a raking cornice, which will mitre with a level one; and the return at top for an open pediment:

(Fig. A.) Let a be the level cornice; from the face of which, and nearly at equal distances apart on the face, draw lines parallel to the rake; then draw the level lines 1 1, 2, 2, etc., from the face of the cornice a to the perpendicular line $d e$. Draw $f g$ at b square with the rake; and make 1 1, 2 2, etc., at b equal to 1 1, 2 2, etc., at a ; trace the cornice through the points 1, 2, 3, 4, etc., which will be the form of the required cornice. The return at top is set off in the same manner from the perpendicular line $h i$, excepting that the projections at a are taken on the raking line.

MEMORIALS OF PETER THE GREAT.

EVERY little memento of Peter the Great is treasured up with idolatrous affection. In the hermitage, the depository of the chief treasures of art in St. Petersburg, are many objects that call to mind the pioneer of Moscovite greatness. There are so many of them that the suit of rooms is dignified with

the term, *Peter the Great's Gallery*. The most of them illustrate his life, industry, and mechanical skill. There are several of his canes, and in the head of each of them is something useful—a compass, a watch, or something else. Here are the turning lathes and instruments for carving, worn smooth by his own royal hands; then his telescope, mathematical instruments, books, and many other objects in great profusion. Here is the heavy iron staff he carried, which testifies to his gigantic strength; also a long wooden rod, which was the measure of his enormous height. There is also a small gilt chariot in which he occasionally rode; this is one of the very few gay looking curiosities in the gallery. There is an effigy of him, in the dress of the period, embroidered by Catharine I., for her coronation; and on each side of it are casts and portraits of Peter, taken after death by his painter, Tanhauer. The effigy is placed opposite the stuffed skin of the horse which he rode at Poltava, the scene of his greatest victory. Under the glass cover, protecting the latter, are three favorite dogs of the monarch. One of the most interesting objects in this extraordinary collection is the cast of Peter the Great's face, taken when he was alive; it is made of wax, and is furnished with long black hair and small moustaches. It was attached to a wooden bust, and presented by Peter to his friend Cardinal Valenti, of Rome. One of the features of the gallery is an immense collection of snuff boxes, all belonging to or in some way connected with royal personages. One of them was once the property of that prince of snuff-takers, Frederick the Great, and presented by him to one of his generals. It is inscribed with the following words: "Here I present him something; let him raise the top well up, for the contents are good."

But still more interesting than the gallery is the cottage that Peter the Great used to occupy. It was the first

house and palace built by him on the banks of the Neva, in 1703. On the way to it I passed the spot where the attempt to shoot the present emperor, in 1866, was foiled by a journeyman tailor, since elevated to a very high rank of nobility. A shrine has been erected there now, and is ornamented by the usual gilt image and the ever-burning lamp. All Russians in passing take off their hats, cross themselves, repeat their prayers, and pass on. The cottage of Peter the Great is a plain frame dwelling, fifty-five feet long and twenty feet broad, containing but two rooms and a kitchen. The room on the left was Peter's bedroom and dining-room, and that is now used as a chapel. An image of Christ, supposed to possess miraculous powers, carried by Peter the Great on all his campaigns, and alleged to have assisted in gaining his victories, hangs at the door, and receives the salutations of multitudes in the course of the year. The visitor is shown the boat which Peter built himself, the remains of the sails, and the bench on which he used to sit, peasant-like, at his own humble cottage door. Depend upon it, the Russians will yet canonize him.—*Dr. Hurstin.*

MAKING FOUNDATIONS IN MARSHES.

A NEW process of making foundations for bridges in marshy soils has been recently used on a branch line of the Charentes Railway Company in France. This line crosses a peat valley to the junction of two small rivers; the thickness of peat was so great that any attempt to reach the solid ground would have been very expensive. In order to obtain cheaply a good support for the bridge, two large masses of ballast accurately rammed were made on each bank of the river, and a third one on the peninsula between the two. The slopes

of these heaps were pitched with dry stones, for preventing the sand from being washed away by the rain or by the floods in the rivers. Over the ballast a timber platform is laid; this platform carries the girders of the bridge, which has two spans of about sixty feet each. When some sinking down takes place, the girders are easily kept to the proper level by packing the ballast under the timber platform; this packing is made by the platelayers with their ordinary tools. This simple and cheap process has succeeded quite well.

The same difficulty was overcome by a different plan on an ordinary road near Algiers. This road crosses a peaty plain nearly one mile broad; the floods and elasticity of the ground prevented the formation of an embankment. The road was to be carried over a viaduct across the valley, but the foundations of this viaduct presented serious difficulties, the thickness of peat or of compressible ground being nearly eighty feet. It was quite possible to reach the solid ground with cast-iron tubes sunk with compressed air, or with any other system, but neither the implements nor the suitable workmen were available in the colony, and it was a great expense to bring them, and especially the workmen, from France. The use of timber piling was of course out of question, as timber is very expensive in Algiers, and quickly becomes rotten, but there was a set of boring implements with which the men used to work it. The engineers began boring holes ten inches in diameter down to the solid ground. These holes lined with thin plate iron pipes were afterwards filled with concrete up to the level of the ground. Each of these concrete columns bears a cast iron column; these columns are properly braced together, and support the girders of the viaduct, which is divided into spans of about twenty feet, and is twenty feet high over the ground. The system has succeeded very well, and is to be extended to another large valley.—*Cor. The Engineer*

THE LABOR QUESTION CONSIDERED.

TO the intelligent observer the "Labor Question" is the great problem of the day. Political economists are unable to solve it from the fact that all their deductions and conclusions are based on the past. It will not do in this fast age to refer to the past and conclude that, because certain results followed a particular state of affairs heretofore, that the same results will necessarily follow a like state of affairs now. Twenty years ago it seemed to be a fair conclusion that the introduction of machinery would seriously interfere with the industry of artisans. It was supposed that the building of railroads would render useless the great number of horses used in stages and "Conestoge," and other wagons used then to transport merchandise of all kinds to the interior of the country; but we see that horses are more scarce now than they were before railroads were built, and that skilled workmen are in greater demand now than they were before so much labor-saving machinery was introduced.

It was feared that the sewing machine would deprive females of the means of subsistence, but we find the results just the contrary. Female labor is in more demand, and is now better paid than it was before the sewing machine was invented. In regard to the sewing machine, it may be truly said that the increased amount of ornament now put on garments, in a measure neutralizes the advantages gained by the increased facility of production in clothing of all kinds; but we find the sewing machine employed in other branches of industry, and still the *Human Machine* is in much greater demand in these same branches. It may be said that there are fewer apprentices to mechanical business, and fewer journeymen being made, than was

the case heretofore; and this seems plausible, and to a certain extent it is the case. There is not, at present, in Philadelphia, (which I take as a great manufacturing centre,) one-tenth as many apprentices as there was in 1840, although our population has been nearly doubled, and our manufacturing products quadrupled. But this does not prove that there is less *manual labor* now being done. In former times, when most labor was done with the hands, an apprentice was indentured to *learn a trade*, and he served for four to seven years, and the master was bound to teach him all the mysteries of the business, and none but regular journeymen, who had served their apprenticeship, could get employment. Since the introduction of machinery the production of any particular article, complete in all its parts, is not required of the workman, as the various parts are made in detail by the machine, and the skilled workman is only required in the most essential and difficult parts. The great bulk of the labor, and the tending of the machinery, is done by boys and laborers. If all of the boys, that for the past twenty years have been employed in our different manufacturing establishments, had been indentured regularly to learn a trade, as was the case formerly, we would find the increase of apprentices fully equal to the increase of manufactures and population. This does not apply to all trades, as bricklayers, stone-cutters, stone-masons, and such others where the character of the work to be done precludes the possibility of its being done in factory buildings or fixed localities. Even in these trades we find a disinclination on the part of both masters and boys to enter into articles of indenture. The master prefers to pay the boy so much per week for a given number of years,

and thus relieves himself from the responsibility of the boy's conduct, and the boy prefers this plan because he is under no restraint from his employer after the day's work is done, and is free to follow the bent of his inclination, too often to his destruction from the absence of the proper restraint and guidance that was formerly exercised by the master. Under the old apprentice laws, a master not only had the right, but was required under penalties to exercise a parental supervision over the conduct of his apprentices, not only in his workshop and dwelling, but in all places and at all times. Thus the boy was ruled by what one of our statesmen called the "Patriarchal Tenure," that is, the boy was received into the master's household as one of his family, and was provided with food, clothing, and a certain amount of schooling, and all of his domestic wants were supplied, and were attended to the same as were those of his own children. Thus the boy was disciplined into strict habits of obedience during the most critical period of his life, between the ages of from fifteen to twenty-one, when the habits of life are irrevocably fixed, and the character of the coming man is moulded for good or evil. In those days it was a common occurrence for a master to cowhide a refractory boy into obedience, and that without fearing a prosecution for assault and battery. The writer of this has often exercised this right, and in most cases with beneficial effect. In fact, within a few months a gentleman called on me, and introduced himself as Col. B—, of the army, and not being recognized he asked if I remembered an apprentice of mine, named Bill B—, that I gave a good whipping to, on February 14, 1852. I then recollected the circumstance, and he told me that he kept the stick with which I whipped him, and had engraved on it the date and occasion, and that the mortification of being thus whipped exercised such a salutary effect on him, that he aban-

doned his bad habits and became, as I saw him then, a man of repute and position, and that it was all owing to the castigation, as he admitted; that previous to this he was an incorrigible bad boy. It would not be safe to try whipping on an apprentice in these days, from the fact that you have to run the risk of a *knife* or *bullet*, and if you escape these you would be mulcted in damages in court for having the temerity to whip an American citizen, even if he was your apprentice, and had merited the punishment. The present system of apprenticeship, or working under instructions, is no doubt a great evil, and results as much to the disadvantage of the master as that of the boy. The reader may ask what has all this to do with the labor question. I will answer, "That as the twig is bent the tree is inclined," and we might as well expect perfect fruit on a diseased tree, as good journeymen from a bad system of apprenticeship. Our mechanic is degenerating into an irresponsible workman, without thought, without responsibility, and whose whole aim is to do as little work for the wages he receives as he possibly can, and shave as much as he can off of his contract of ten hours per day. He is discontented, and assumes that the capitalist is his enemy, and acting on this opinion he is organizing, politically, to obtain the most he can from the capitalist, either by reduction of the number of hours to constitute a day's work, or by enforcing that most unjust and obnoxious of all doctrines, namely, agrarianism. You are rich and I am poor; you have never worked; I have toiled year after year cheerlessly, until age has palsied my limbs. I have earned all you possess, but you have had the enjoyment of the product of my labor. You in your old age have your comfortable and luxurious home, surrounded with those you love, who minister to your slightest wants, whilst I, who have earned all, have received but a moiety of my earn-

ings, and now, at the time when my strength fails me, and I am warned that I can labor no longer, I have but one recourse left, to go to the Almshouse. God is just; you are rich; I am poor—you must divide. This is no fancy sketch as every person who comes in contact with the workingman, knows it to be the truth, and although the time has not yet come when these doctrines are to be enforced, still all observing men can see it in the near future. The spirit of Republican ideas and institutions accelerates this movement which will rack civilization to its centre. Let those who are skeptical refer to the causes that produced the French revolution, and read the subtle and specious arguments of the demagogues who controlled that movement, and they will find that in the present discontented condition of the producing classes, the same elements are at work. The demagogues are not wanting now. Whose fault it is that this state of affairs is fast coming upon us, I am not prepared to say. Probably there is fault all round. The employers watch every opportunity to reduce wages, even to a starving point, and workmen do the same to exact an unjust compensation, as has been particularly shown in the coal mines of this State, during the past year. Organization on the part of employers, counter organization of the employees has engendered hate, even to murder, in each party, forgetting that they are mutually dependant on the other, and that common sense, if not principle, should influence both parties in making an equitable arrangement, founded on justice. Of one fact we are painfully aware, that it seems that the tendency of all modern legislation, whether intentional or not, is to oppress the poor, who are helpless, and to benefit the rich, who need no help. The Declaration of Independence says that all men are born free and equal. This reads very well, but is its practical application

satisfactory? Experience has taught us that where one man is born with the capacity to govern, there are thousands born who are only fit to be and must be governed, and one of the great troubles that society is now afflicted with is, that those whose natural capacity is of that peculiar character that they require to be governed have usurped the place of those who have the capacity to govern, and hence we find the statesmen in natural capacity, working on the *shoemaker's bench*, and the one whom nature intended for a shoemaker, has by chicanery, by specious appeals to prejudices, or by one of the freaks of the blind Goddess, become our governors. There are certain inherent rights that all men possess, and in the rational enjoyment of these rights they should be protected, and the boundary or limit of these rights is now the great question, and in disposing of it we will require the best talents of the country in our legislative halls. In defining and securing the rights of one party we must be careful that great injustice is not done to others. As I have said before, the labor of the world is organizing to obtain power, and it will be successful as it possesses the power of numbers. God grant that it may be guided by wisdom, and that it may not become the tool of demagogues.

GEO. J. HENKELS.

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WE do not remember the exact date of the invention of stoves, but it was some years ago. Since then mankind have been tormented once a year, by the difficulties that beset the task of putting them up, and getting the pipes fixed. With all our Yankee ingenuity no American has ever invented any method by which the labor of putting up stoves can be lessened. The job is

and thus relieves himself from the responsibility of the boy's conduct, and the boy prefers this plan because he is under no restraint from his employer after the day's work is done, and is free to follow the bent of his inclination, too often to his destruction from the absence of the proper restraint and guidance that was formerly exercised by the master. Under the old apprenticeship laws, a master not only had the right, but was required under penalties to exercise a parental supervision over the conduct of his apprentices, not only in his workshop and dwelling, but in all places and at all times. Thus the boy was ruled by what one of our statesmen called the "Patriarchal Tenure," that is, the boy was received into the master's household as one of his family, and was provided with food, clothing, and a certain amount of schooling, and all of his domestic wants were supplied, and were attended to the same as were those of his own children. Thus the boy was disciplined into strict habits of obedience during the most critical period of his life, between the ages of from fifteen to twenty-one, when the habits of life are irrevocably fixed, and the character of the coming man is moulded for good or evil. In those days it was a common occurrence for a master to cowhide a refractory boy into obedience, and that without fearing a prosecution for assault and battery. The writer of this has often exercised this right, and in most cases with beneficial effect. In fact, within a few months a gentleman called on me, and introduced himself as Col. B—, of the army, and not being recognized he asked if I remembered an apprentice of mine, named Bill B—, that I gave a good whipping to, on February 14, 1852. I then recollected the circumstance, and he told me that he kept the stick with which I whipped him, and had engraved on it the date and occasion, and that the mortification of being thus whipped exercised such a salutary effect on him, that he aban-

doned his bad habits and became, as I saw him then, a man of repute and position, and that it was all owing to the castigation, as he admitted; that previous to this he was an incorrigible bad boy. It would not be safe to try whipping on an apprentice in these days, from the fact that you have to run the risk of a *knife* or *bullet*, and if you escape these you would be mulcted in damages in court for having the temerity to whip an American citizen, even if he was your apprentice, and had merited the punishment. The present system of apprenticeship, or working under instructions, is no doubt a great evil, and results as much to the disadvantage of the master as that of the boy. The reader may ask what has all this to do with the labor question. I will answer, "That as the twig is bent the tree is inclined," and we might as well expect perfect fruit on a diseased tree, as good journeymen from a bad system of apprenticeship. Our mechanic is degenerating into an irresponsible workman, without thought, without responsibility, and whose whole aim is to do as little work for the wages he receives as he possibly can, and shave as much as he can off of his contract of ten hours per day. He is discontented, and assumes that the capitalist is his enemy, and acting on this opinion he is organizing, politically, to obtain the most he can from the capitalist, either by reduction of the number of hours to constitute a day's work, or by enforcing that most unjust and obnoxious of all doctrines, namely, agrarianism. You are rich and I am poor; you have never worked; I have toiled year after year cheerlessly, until age has palsied my limbs. I have earned all you possess, but you have had the enjoyment of the product of my labor. You in your old age have your comfortable and luxurious home, surrounded with those you love, who minister to your slightest wants, whilst I, who have earned all, have received but a moiety of my earn-

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as severe and vexatious as humanity can possibly endure, and gets more so every year.

Men always put their stoves up on a rainy day. Why, we know not; but we never heard of any exception to this rule. The first step to be taken is to put on a very old and ragged coat, under the impression that when he gets his mouth full of plaster it will keep the shirt bosom clean. Next, the operator gets his hand inside the place where the pipe ought to go, and blacks his fingers, and then he carefully makes a black mark down the side of his nose. It is impossible to make any headway, in doing this work, until this mark is made down the side of the nose. Having got his face properly marked, the victim is ready to begin the ceremony.

The head of the family—who is the big goose of the sacrifice—grasps one side of the bottom of the stove, and his wife and the hired girl take hold of the other side. In this way the load is started from the woodshed toward the parlor. Going through the door, the head of the family will carefully swing his side of the stove around and jam his thumb nail against the door post. This part of the ceremony is never omitted. Having got the family comfort in place, the next thing is to find the legs. Two of these are left inside the stove since the spring before. The other two must be hunted after, for twenty-five minutes. They are usually found under the coal. Then the head of the family holds up one side of the stove while his wife puts two of the legs in place, and next he holds up the other side while the other two are fixed, and one of the first two falls out. By the time the stove is on its legs he gets reckless and takes off his old coat, regardless of his linen.

Then he goes for the pipe and gets two cinders in his eye. It don't make any difference how well the pipe was put up last year it will always be found a little too short or a little too long. The head of the family jams his hat over

his eyes and takes a pipe under each arm goes to the tin shop to have it fixed. When he gets back, he steps upon one of the best parlor chairs to see if the pipe fits, and his wife makes him get down for fear he will scratch the varnish off from the chairs with the nails in his boot heel. In getting down he will surely step on the cat, and may thank his stars that it is not the baby. Then he gets an old chair and climbs up to the chimney again, to find that in cutting the pipe off, the end has been left too big for the hole in the chimney. So he goes to the wood shed and splits one side of the end of the pipe with an old axe, and squeezes it in his hands to make it smaller.

Finally he gets the pipe in shape, and finds the stove does not stand true. Then himself and wife and the hired girl move the stove to the left and the legs fall out again. Next it is to move to the right. More difficulty now with the legs. Move to the front a little. Elbow not even with the hole in the chimney, and the head of the family goes again to the wood shed after some little blocks. While putting the blocks under the legs, the pipe comes out of the chimney. That remedied, the elbow keeps tipping over to the great alarm of the wife. Head of the family gets the dinner table out, puts the old chair on it, gets his wife to hold the chair, and balances himself on it to drive some nails into the ceiling. Drops the hammer on wife's head. At last gets the nails driven, takes a wire swing to hold the pipe, hammers a little here, pulls a little there, takes a long breath, and announces the ceremony concluded.

Job never put up any stoves. It would have ruined his reputation if he had. The above programme, with unimportant variations, will be carried out in many respectable families during the next six weeks.—*Mark Twain.*

The above remarks are seasonable, and feelingly appeal to the fingers of the many.

THE DOME OF THE UNITED STATES CAPITOL.

THE United States Capitol consists of a centre building, commenced in 1793 and finished in 1811; and two wing buildings, with connecting corridors, commenced in 1851 and finished in 1865, making a group, the greatest length of which is 751 feet, and the greatest width 324 feet, covering an actual surface of more than *three and a half acres*, of which the original Capitol covers 62,210 square feet, and the new wings and corridors 91,911 square feet.

The new Dome, which is substantially the subject of this paper, surmounts the original Capitol, to which it will be proper, in this connection, briefly to refer.

This building, which now constitutes the central portion of the extended Capitol was founded by Washington in the year 1793;—the original design was by Dr. William Thornton, an amateur architect, afterwards Superintendent of the Patent Office. The plans were modified, and the work of the north wing commenced by Mr. S. Hallet, an English architect, who was succeeded by Mr. G. Hatfield, an architect of fine taste and skill; before the north wing was completed, Mr. Hatfield resigned, and the architect of the President's House, Mr. James Hoban, succeeded him, and finished that portion of the work.

In the year 1803, the appointment of architect of the Capitol was conferred by President Jefferson upon Mr. Benjamin H. Latrobe, and it was under that distinguished artist that the south wing was constructed. Mr. Latrobe was succeeded by Mr. C. Bulfinch, who erected the rotunda, and finished the work, chiefly after Mr. Latrobe's designs.

The original Capitol, as thus completed, was crowned by a dome proportionate to the size of the structure, and in accord with its architecture, but when the present wing buildings and corridors were added, it ceased to be a fitting

centre of the extended group; it therefore became necessary to remove it, and to erect in its place a structure more consistent with the magnitude of its present surroundings, and more in harmony with the ornate architecture of the added buildings.

The foundations of the old dome did not, however, admit of being extended, or changed in any way, without involving the removal and reconstruction of the entire rotunda, and its adjacent walls; but the idea of resorting to such an expedient could not be entertained; the preservation of the rotunda intact was a condition that admitted of no discussion; it therefore became necessary to adopt a material for the construction of a new dome that would be durable, and at the same time afford the means of giving larger dimensions, without greatly increasing the superincumbent weight.

These objects appeared to be attainable only by the use of iron, as no other material, proper for such a structure, would admit of being wrought into such forms as were required to produce a proper architectural effect, without overloading the foundations. These considerations led the architect, more as a matter of necessity than of choice, to adopt iron for the entire superstructure, and it should be remarked, that the work is carried out in accordance with this decision; every part of it—inside and outside—frame work and ornamentation, is composed entirely and exclusively of iron. This fact renders the structure peculiar; iron has, it is true, entered more or less into the construction of other domes, but in none has it been used exclusively, except in that of the Capitol.

The old rotunda has been retained without alteration. It consists of a cylindrical room, 96 feet in diameter and 48 feet in height, faced with cut-stone and finished with a heavy projecting

stone cornice. The entire superstructure above this cornice was taken down. It consisted of an inner semi-spherical vault of 96 feet in diameter, and an outer dome of hemi-spherical form, resting upon receding courses of cut-stone, and rising to the height of 145 feet above the pavement. The inner vault, with its spandrels and abutments was chiefly composed of bricks and stone; the rest of the superstructure consisted of heavy timbers, sheathed with boards and covered with copper. The aggregate weight of the portions which were removed to give place to the iron structure was ascertained by careful calculation to be 5,926 tons, while the actual weight of the new dome, at the same level, amounts to 6,786 tons, being an access of but 860 tons. It may be remarked, in this connection, that the new dome extends over many of the adjacent walls of the building which were not reached by the original structure, they increasing its points of support, and giving it advantages that more than compensate for the difference in the actual weights of the old and the new constructions.

THE EXTERIOR

Of the new dome consists of an octagonal base of 135 feet in diameter, rising 25 feet above the top line of the buildings, and terminating in a circular stylobatum of 125 feet in diameter: From this foundation rises a peristyle, or circular colonade, consisting of 36 fluted cast-iron columns, 27 feet in height, with attic bases, and elaborate foliated capitals, embellished with imitations of tobacco, thistles, cotton, and Indian corn. The shafts of these columns are 2 feet 2 inches in diameter, and 22 feet 8 inches long; they were each cast in a single piece, weighing 2,240 pounds.

The peristyle is surmounted by a balcony, from which a fine view is afforded of the city and surrounding country,—its height above the ground is 130 feet.

The drum, or body of the peristyle,

which rises 31 feet above the balcony, consists of a highly ornamented order of pilastering, supporting an attic composed of massive consoles, which form a pedestal for the cupola, or semi-spherical portion of the structure, the diameter of which is 88 feet. The covering, or roof of the cupola, consists of cast-iron tiles, so formed as to present an appearance similar to the marble roofs of the ancient Greeks, with saddles, and elaborate tile ornaments.

The cupola is truncated on top, forming a level surface of 35 feet in diameter, protected by a massy balustrade, from which another fine view of the city and its surroundings is afforded at a height of 215 feet above the ground. From this platform rises the Lantern, or *Tholus*, consisting of a circular structure of 72 feet in height, composed of a pedestal of 20 feet in diameter by 13 feet in height, supporting a peristyle of 12 columns surmounted by an entablature from which rises a highly ornamented pedestal, crowned with the "Statue of Freedom," which is 19 feet 6 inches in height, making the entire height of the Dome 287 feet 6 inches above the pavement on the eastern front of the Capitol. The statue was cast in bronze, by Clark Mills, from a plaster model executed in Rome by the late Thomas Crawford. The work was done at the foundry of Mr. Mills, near Washington. The entire cost of the figure alone, delivered on the grounds of the Capitol, was \$23,796; and its weight is 14,985 pounds—it was cast in five sections, and put together with "sleeve-joints" secured by heavy counter-sunk rivets. The weight of the heaviest section is 4,740 pounds.

This crowning feature of the national Capitol represents "Armed Liberty" reposing upon the shield of the United States; her triumph is represented by the wreath held in the same hand which grasps the shield; she holds a sheathed sword in her right hand to show that her conflict is over, and her cause triumphant, and at the same time to indi-

cate that she holds her weapon ready to be unsheathed whenever it may be required for future use. The initials of our country are placed upon her heart, and the drapery is so disposed as to indicate rays of light proceeding from the letters. The zone of stars that encircles her head is intended to be expressive of a celestial origin, and an endless existence; and her position on the globe shows the supremacy she is destined to exert over the world.

In the original design of Mr. Crawford for this statue, the head was crowned with a Liberty cap; but this was objected to by Jefferson Davis, who was then at the head of the War Department, on the ground that the cap of liberty is an emblem or "badge of the freed slave," and not of "a people who were born free, and would not be enslaved." The cap was therefore dispensed with, and a helmet substituted, "the crest of which (in the language of Mr. Crawford) is composed of an eagle's head, and a bold arrangement of feathers suggested by the costume of our Indian tribes."

The substitution of this *helmet* for the original *liberty cap* was an unfortunate alteration. Although this helmet is a very beautiful work of art, when near the eye, it is impossible at the height of nearly 300 feet, to form any idea as to what it is, or what it is intended to represent. The eagle's head cannot be recognized at all, and there is nothing in the contour of the helmet to indicate its purpose. In other respects, the statue on the Dome of the Capitol is an admirable work of art. The engraving of it on the United States five-dollar notes is an accurate representation of it, taken from a photograph of the model.

THE INTERIOR.

The cylindrical form of the Rotunda is carried up to the height of 109 feet above the floor. The first or lower section is 48 feet in height, and consists of the original structure, which, as before remarked, remains unchanged. The sec-

ond section is 27 feet in height, and embraces a series of panels and a congeries of annular mouldings, above which there has been left a recess, or panel, of 1 foot in depth, 9 feet in height, and 145 feet in length, being the entire inner circumference of the Rotunda. It is proposed to fill this recess with a continuous belt of sculpture, in bass-relief, containing a figurative representation of portions of our national history. The third, or upper section consists of an order of 36 highly ornamented pilasters, resting on pedestals, with intervening balusters; from the cornice of this order rises the ceiling of the rotunda, which consists of a semi-spherical concave surface, richly ornamented with foliated bands, rosettes, and deep octagonal panels. This inner dome or cupola terminates with an eye of 50 feet in diameter, encircled with a massy balustrade, at the height of 150 feet above the floor of the Rotunda.

Over the eye of the Dome, and at the height of 10 feet above it, a canopy is constructed, consisting of a segment of a sphere with a chord of 66 feet, and a versed sine of 20 feet, composed of iron lath secured to ribs of the same material. On this canopy there is an allegorical picture by Brumidi, painted in real *fresco*, (fresh mortar,) containing an apotheosis of Washington in the centre, and six groups around the circumference, emblematic of War, Agriculture, Mechanics, Commerce, Navigation, and Science. The height of the canopy above the floor is 180 feet.

Between the inner and outer surfaces easy, convenient and safe stairways are constructed from the bottom to the top, so that the most fearful may reach the highest platform without danger or apprehension.

The weight of all the iron used in the construction of the Dome amounts to 9,660,014 pounds, and the entire cost of the work was about one million of dollars.

T. U. W.

AMERICAN RAILROADS IN RUSSIA.

REV. Dr. Hurst, writing in the *Methodist*, thus describes the results of American enterprise in building and managing railroads in Russia:

"For once, at least, the American in Russia feels at home, and that is when he is seated in one of the thorough American cars built by the Winans Brothers for the road between St. Petersburg and Moscow. The seats of all are very comfortable, while the first-class cars are divided into little rooms, and provided with every accommodation for sleeping. There are enough people in Russia to complain that the shrewd Baltimorean firm have made immense sums of money out of the government, but no one dare say that they have not managed the road as well as possible, and that they have not been honorable and above board in the discharge of every obligation. That they have been too shrewd for the Russians, and have understood their business well, does not admit of a doubt; for when the Russian Government found that they were deriving enormous profits for their management of the road, and, when, after the contract had expired, a new one was made with a French company, the road was so badly managed that the aid of the Winanses was again invoked, and a contract was then closed with them, which has again proved so advantageous to them that the Russian Government has just paid them six millions of rubles to be released from only the last two years of it, which, according to the original terms, should have extended to 1872. Even this was a very low price, and it is conjectured that the Winanses only accepted it with the understanding that they were to have in hand the completion and conduct of the greater part of the road already commenced to the Caspian Sea. These facts are given on

the authority of a gentleman who has been connected with them in railroad management, and enjoys their confidence.

"The fastest train on the road from St. Petersburg to Moscow occupies twenty hours. This road was devised and ordered by the Emperor Nicholas, purely for military purposes, and was therefore made in a straight line. It scarcely comes within sight of a large town during the whole distance, and there are no branches. It is now regarded by Russians as a special favor to be permitted to pay their thirteen rubles, and ride over the same distance that used to occupy a week to traverse. At appropriate intervals there are splendid restaurants, probably the best on any railroad in Europe: ample time is allowed for eating. In the same rooms are offered for sale collections of objects peculiar to Russia, such as cutlery, silverware, fancy feather articles, and Asiatic embroideries and gold stuffs. I enjoyed the tea at these stations more than anything else on the way, for it was, without exception, of delicious flavor. Next to brandy, tea is the national drink of the Russians. It is all brought overland from the fields of Asia. In the restaurants it is served in large glass tumblers, and costs from ten to twenty cents a glass. A slice of lemon is given to those who do not wish milk. As for sugar, the Russian does not put it into his tea or coffee, but into his mouth, and lets lump after lump dissolve as he drinks. The favorite resting place for the sugar is between the lower front teeth and the tip of the tongue, and the tea is made to pass through the sugar as through a sponge. A Russian has already given me a lesson in the art, but he has had the poor encouragement of seeing me afterward relapse into my former extra-Russian barbarism."

ESSAYS ON LANDSCAPE GARDENING.

BY H. W. S. CLEVELAND. No. 1.

IT was said by Loudon, nearly forty years ago, that "The principal defect of English villas, is the want of sufficient union between the house and grounds, or in other words, of co-operation between the architect and landscape gardener. Our parks may be beautiful and our mansions faultless in design, but nothing is more rare than to see them properly connected."

Whatever improvement may since have been made in England, the above statement is lamentably applicable at this day in our own country. We see continually, not an utter want of connection, but a direct diversity of design, —the grounds of a modest residence which might be exceedingly attractive as a simple country home, arranged and adorned in imitation of a style which would be appropriate for a palace, while those of a pretentious mansion are left in a state of nature, or perhaps planted with fruit trees or devoted to field crops.

The arrangement of the grounds pertaining to a house of any architectural pretension, whether the area be large or small, has so important an influence upon the character and expression of the place as a whole, and is capable of aiding so essentially in developing and, as it were, translating the design of the architect, so as to render it palpable to the casual observer, that the art of landscape gardening ought always to be considered as the handmaid, and inseparable attendant of that of Architecture. Every Architect who is worthy of the name will recognize and admit this truth, and no one who has a just sense of its importance, can fail to regret the obstacles which prevent the more intimate union of the two. Of these, the primary one is the incapacity of the great majority of employers to per-

ceive or admit its necessity, and their unwillingness, even when convinced that it is not without foundation, to employ an artist who is competent to its performance. Being himself incapable of distinguishing the true artist from the mere gardener, the proprietor very likely considers himself fortunate and thinks he has secured the best available talent, when he has engaged the services of a man who may have been thoroughly educated as a professional gardener and florist, and be entirely competent to produce a pretty effect by the tasteful arrangement of garden beds and a judicious mingling and massing of flowers and shrubbery, and yet be utterly incapable of seizing upon the natural characteristics of an extended tract, and forming and carrying out a design for their development, in keeping with the architectural character of the house, which should be the culminating point, so as to give a unity of expression to the whole. In fact it is a matter of every day occurrence, that men whose means enable them to indulge in the luxury of a costly country residence, and who have no experience whatever in arranging the surroundings, have so little conception of the requirements of the case, that they do not even recognize the necessity of seeking any aid beyond that of mere laborers who can carry out the designs which they think themselves perfectly competent to direct. There is probably not a landscape artist of any skill or capacity in the country who has not become familiar by constant repetition with the ease of the man, who, after perhaps years of vain efforts to arrange his grounds in such a manner as to satisfy himself, has at length arrived at a conviction of his own incapacity, and the necessity of employing a competent director, and who,

when he sees how such a man, by a few apparently simple touches and changes which had never once occurred to him, but the good sense of which he readily acknowledges, develops beauty and attractive interest where he had produced only awkward formality, is awakened to the fact that the creation of a pleasing landscape is even more of an art than is portrayal on canvass, which he would never have dreamed of attempting. Perhaps as good a way of forming an opinion of the real artistic merit of the places one sees, which are intended to be attractive, and on which money has been lavishly expended for that object, is to consider them in comparison with landscape paintings, whose beauty we acknowledge at a glance, and try to imagine whether we should be likely to be similarly affected by an exact representation on canvass of the scene before us.

It is not, perhaps, surprising while such ignorance prevails among employers, that good gardeners, even though they are thoroughly honest men, should assent to a practice which gives dignity to their profession, and in which they are often as ignorant of deceit as those by whom they are employed. They may have been thoroughly instructed in their profession,—many of them are enthusiastic florists and botanists, and have a genuine knowledge and love of their duties, which enables them to feel themselves in that respect the superiors of their employers, and each may be equally ignorant of the fact that they are transgressing the laws of good taste,—and while the health and vigor of the trees and flowers, and the perfectly nice keeping of the lawns and paths, may be highly creditable to his skill as a gardener, yet the whole may be utterly wanting in character, or glaringly at variance with the natural features of the ground or the architectural style of the house,—just as the house itself may be an admirable specimen of masonry or carpentry, while it is utterly

wanting in symmetry or architectural merit, and yet be looked upon by both owner and builder with a feeling of supreme satisfaction. It is idle to look for a general improvement in the character of workmen until employers become conscious of the defects of their work, and demand the services of a superior class. This can only result from the more general diffusion of knowledge of the objects and principles involved, which of course is the work of time. We have cause for encouragement in the advance which has been made within the memory of many who are still in active life, who can recall the time when a man would have been set down as a fool, who had seriously attempted to support himself by making designs for the tasteful arrangement of grounds pertaining to private estates. There is great reason to apprehend, however, that the love of country life, which for a period of fifteen or twenty years before the war, had been rapidly extending among the more cultivated classes, is, if not suffering a decline, at least becoming less generally attractive than was then the case. This is owing in part to the more general love among both men and women of sensational life, which cannot be satisfied with the simplicity and quiet enjoyment of rural pursuits, and (with women particularly) in the more reasonable and serious objection of the increased difficulty of obtaining trustworthy domestics, which renders it incumbent upon the mistress of the household to subject herself to a life of drudgery, unless she is content to shut her eyes to constant violations of every precept of good housekeeping. This alarmingly increasing evil is in some measure the result of the one first mentioned. The demand of modern civilization, which implies a degree of fashionable extravagance unknown to former generations, involves an amount of labor which is in such contrast with the lives of those for whom the labor is performed, that it is not surprising that

it does not prove attractive to the women, who under a more rational system, would constitute the best class of servants, while those of inferior capacity become spoiled by its example and seek to indulge a similar taste in their more humble sphere, which they can accomplish much more effectually in the city than the country, and hence their repugnance to the latter.

But this is a digression, though I trust a pardonable one in consideration of its connection with the subject.

There is much in the practice of landscape gardening, which must necessarily be learned as any artisan learns his trade,—by written or verbal instruction, combined with actual experience in manipulation or giving directions,—but beyond this, there is required an intuitive capacity of appreciating effects, and of arranging materials to produce them, which can neither be imparted to or acquired by the man to whom the gift is not natural. It cannot even be defined by him who possesses it, because its application is hardly in any two cases alike. Its possessor will direct certain arrangements of plantations, or mouldings of surface, or shapes of lawn or water, the graceful design of which will be at once acknowledged when seen,—and yet be unable to give any explanation of his reasons for doing so, beyond the simple fact that it was the most natural disposition that came to his mind. It is true, he may point out how certain effects are secured by it, the pleasing result of which is readily apparent, but this does not touch the secret of its existence, and the attempt at its repetition elsewhere may fall as far short of the original as a waxen image does of the living embodiment of beauty. And this leads to the further remark that much of the work of the landscape gardener must be taken upon trust, since it is not only the case that many years must elapse before the best effects of his design will become developed, but if he makes his plantations

as he should do, at such distances from each other as will insure the final result he desires, the primary effect will be so meagre and unsatisfactory, that to the eye of one whose experience does not enable him to realize the changes which growth will produce, the deficiency will excite only a feeling of disappointment. This may be to some extent relieved, as it commonly is, by planting thickly with the intention of future thinning out, but unfortunately, this is rarely done, or at least, is deferred till the trees have so injured each other that their individual capacity for picturesque or beautiful effect is forever lost. The designer, in nine cases out of ten, has no further control of the management of the place, after its first arrangement is completed, and while there are few artists who dare risk their reputation by planting in the first place, only so many trees as will be finally needed, and at such distances from each other as they will require to be when full grown, there are still fewer proprietors who have the moral courage, even if they have the requisite knowledge, to thin them out as they should at the proper time. It is hardly too much to say that there is not a place in the country that has been planted ten years, that would not be improved by removing one-half the trees which were first planted, or which were originally growing upon it in natural forest.

But this allusion opens a subject of sufficient importance to demand more space than can be given at the end of an article already sufficiently extended.

THE SECRET VAULTS BENEATH CONSTANTINOPLE.—A correspondent of the French Official Journal writes as follows:

About forty years ago, when a large house in Constantinople had sunk beneath the level of the soil, an immense series of subterranean vaults were dis-

covered, supported by magnificent marble pillars, which, judging by their rich decorations, were the work of Greek artists. Underneath the vaults is a lake of unknown extent and of considerable depth. This mysterious construction, of which history makes no mention, is supposed to extend under a considerable part of the city. The principal entrance, being the only one accessible to visitors, is situated in the court-yard of a private palace, the proprietor of which has a boat in which he amuses himself sailing about within a hundred yards of the entrance.

Last month an Englishman, accompanied by a sailor, desired to explore the lake thoroughly. Having obtained the necessary permission, he set forth on his adventurous journey, but never returned, he and the sailor having been asphyxiated beyond the reach of help. Another Englishman volunteered to go alone in search of them in another boat, with six torches attached to it; for a long time the reflection of the torches upon the waters was visible to the on-lookers at the entrance, until it was lost in the gloom and darkness. After an absence of two hours, he returned from his unsuccessful search completely exhausted, and nearly choked with the foul air he had inhaled, having in his whole course seen the ranges of vaults and pillars uniformly continued. The Turkish authorities have ordered the boat to be lifted, and prohibited parties from sailing on the lake, but still permit the curious to inspect this singular construction at the entrance, which reminds the beholder of the architectural wonders of ancient Egypt.

HOW TO PRESERVE PENCIL DRAWINGS.—An ingenious means of affecting this has been invented by M. E. Ronget, of Paris. This invention consists in obtaining the fixation of such drawings, tracings, or sketches, by directly pro-

jecting on these latter any suitable adhesive liquid reduced to a fine spray, or in what is commonly called the atomized or pulverized state, by causing the liquid to pass rapidly under pressure through one or more capillary tubes or openings. By this method the defects of the transudation process are entirely done away with, besides which the operation is executed in less time, and may be performed at once by the artist without the slightest difficulty. As for the fixation liquid, any colorless, or nearly colorless, liquid which allows of being atomized, and which, after becoming dry, causes the particles of the charcoal, or other drawing materials made use of, to adhere sufficiently firm to the paper or other drawing surface, may serve for the purpose. Thus, for instance, a liquid, which has given the patentee the most satisfactory results, is obtained by adding to a solution of three ounces of white sugar candy and two ounces of white shellac in about two pints of spirits of wine, a decoction of about one ounce of fucus crispus in one pint of distilled water.

CURIOUS DISCOVERY.—A paper was recently read before the American Association for the advancement of science, which stated that on the southern shore of Lake Superior, in Marquette County, Wisconsin, were found remains of long canals and dams, constructed by the beavers for the purpose of transporting their cuttings consisting of trunks of trees two or three feet long, from the places where trees had fallen, to their lodges. Some of these canals were three, four, and five hundred feet long. They were generally three feet wide, with an average depth of three feet. In order to maintain a continuous depth of water, they made dams at certain distances, and followed the Chinese plan—to whom the lock was unknown—of drawing their cargo from one level to another.

WALLED LAKES.

BY S. S. BABCOCK.

SOME two years since an article was published in *The Detroit Post* concerning Walled Lakes in general, and the one to be found in Oakland county, Michigan, in particular. The writer of the article, after describing one of the walls, proves—or rather would prove, were his statements correct—that this eastern wall was built by some race of human beings, now passed away. As nearly as I can remember, the substance of his remarks is that the wall is built of stones laid in regular order, and with the evident intention of preventing the inundation of the surrounding country, which is below the level of the surface of the lake, and which would, should the wall be removed, be overflowed. He also stated that a plank road had been built upon its summit.

I had heard of this lake several times before, nor was my desire for seeing it at all lessened by the wonderful conclusions to which this writer, who had evidently beheld what he was describing, had arrived. It was with no small degree of satisfaction, therefore, that I found myself, last vacation, in the immediate neighborhood of this same lake. Before an opportunity to visit it arrived, I was obliged to spend several days among people who had spent their lives within one or two miles of its shores. Of course, I made the lake a subject of constant inquiry. I did not find one person who did not believe the walls to have been built by man's agency, but I could not find any one who had found an instrument of any sort, or any one who had ever heard of the finding of any kind of instrument that could have aided in its structure, nor had any one ever found any human remains. All this began to puzzle me not a little, and at the earliest possible moment I paid the lake a visit. I approached it from the

south. My road led through a high, rolling country, where are to be found some of the best farms in the State.

From this direction one comes in view of the lake about half a mile before it is reached. Looking across the lake, which is nearly circular in form, and about six miles in circumference, it needs but a glance to learn that the country on the north is similar to that on the south side.

The outlet of this lake is near the western end of its eastern and western diameter, and is a small stream flowing through a fine farming country. On the east side of the lake is a marsh and tamarack swamp. This swamp, however, is not very extensive, and instead of being lower than the level of the lake is very much higher, and is drained *into* the lake *through* the wall described by the writer mentioned above.

I hope no other searcher after the curious will ever be so severely disappointed as I was upon looking at this wall. I found the remains of the plank road, but used as such no longer—an excellent dirt road occupying its place—and this was the only resemblance to what I had expected from the whole border of the lake.

The wall, which is such only in name, extends along the shore of the lake for a distance of thirty or forty rods, and is an irregular mass of stones of all sizes, from the boulder of two or three tons weight to small sized gravel stones, intermixed with earth, and in many places covered with a deep soil, out of which grow large trees of pine, cedar, basswood, etc. On the western side of the lake, however, is what might, without a very great effort of the imagination, be considered a wall, such as rude people might build. It is some three times longer than the eastern wall. It

has an elevation in some places of four or five feet, and in several places has a nearly vertical front, the cause of which will be stated below. The marsh and swamp lying east of the lake were formerly a portion of the lake, or rather they formed a separate lake connected with the present lake by a strait whose width was about one-half the length of the so-called eastern wall.

If the reader will now try to place before his mind the picture of the lake, he will see that the land on the north and south sides is high and rolling; on the west side more level, and on the east it is low and marshy. The prevailing direction of the wind is from west to east, while in the spring of the year there is usually an eastern wind. The surface of the ground around the lake is thickly strewn with stones of all sizes. The waters of the lake for several rods from shore are but a few feet deep. I drove my horse for three-fourths of a mile, at a distance of three and four rods from the shore, without finding the water deeper than his knees, but I did not find a single stone on the bottom of the lake, yet they must have been deposited there as thickly as on the land.

With these facts before his mind, any one familiar with ice action can account for the walls. During the winter the water has frozen to the bottom, imbedding the stones in the ice. The breaking up of the ice in the spring is always accompanied with a freshet. If left to itself, the ice, of course, melted, and the stones it had lifted, as it floated, were dropped again to the bottom, but if the wind happened to be blowing the ice was driven and piled on the shore, and the stones were thus conveyed to land and heaped together. This action must have continued until all the stones at the bottom of the shallower portions of the lake had been conveyed to the shore, or dropped in deep water. Since then wave and ice have been beating and grinding against these masses of

earth and stone until they have forced every movable particle as far on shore as possible. Wherever the shore was high, as on the west side, those stones and gravel and earth were piled *against* the side of the bank, thus making a wall-like front, but where it was low they were piled *upon* the land, just as they are on the eastern shore. In order to make more certain of this, I was careful to examine, and I found that on the side of the lake last mentioned, the wall, or embankment, had received additions from both sides, thus showing that the water which once occupied the place where now is the marsh, had furnished its share of the material in some long ago time.

After nearly a whole day's examination, I was unable to discover a single fact that would lead to the conclusion that man had anything to do with the construction of the walls; indeed, I found what is common to many lakes, on a smaller scale, and here of considerable magnitude, only because the circumstances for such a structure were very favorable.

Leony Lake, in Livingston county, has a far more wonderful *wall*, for it has an embankment of earth shaped like a large U inverted. This wall is more than half a mile long, has an uniform height of about three and a half feet, and is thirty or forty inches thick. It is situated several feet from the water's edge, and is covered with fair sized "scrub oak." It forms a complete shelter for duck hunters, and no human labor could make it more perfect.

This is also said to be the work of some extinct race, but days spent in examining it has convinced me that no human hand was ever raised to fashion it. A single glance at the steep hillside a few feet in its rear, and the lake in front, and the *how* it was made is at once apparent.

Perhaps no one subject could be found about which so much of interest might be said as about the lakes of

Michigan; yet there certainly seems to be no one who is willing to say it. Many of our lakes have no visible outlet; yet I, with some others, believe they have an outlet through a stratum of gravel beneath the surface of the ground. Again, many lakes lying within sight of each other have a difference in level of many feet. Three in Livingston county have a difference of five, seven, and twelve feet, and are not one mile distant from each other. Who will tell those of us who have no chance to examine for ourselves more about these facts?—*Michigan Teacher.*

ECONOMIZING FORCES.

WHEN one has a steam-engine of the capacity of three or four horse power, by attaching a fly-wheel quite too heavy for an engine of that size, the heavy wheel will absorb nearly all the available force. But by employing a wheel that is just an even balance for the power of the engine, mechanics can avail themselves of all the available force of the engine. If a mason's tender were to employ a hod weighing fifty pounds, he would be able to carry only a few bricks or a small quantity of mortar. But by using a light hod, a tender is able to employ as much as possible of his available strength in carrying his loads. We see an enormous waste of the strength of teams when carting earth from excavations. A small horse, weighing not over 800 pounds, is often required to draw a lumbering cart that will weigh 1000 to 1500 pounds, bearing only a few bushels of earth. With a four-wheeled vehicle properly constructed of the best materials, the same animal might carry over a ton of earth or building materials with far less fatigue than he removes two or three wheel-barrow loads with a huge cart, sufficiently large and strong for a yoke of heavy oxen.

It is a common occurrence in this and

other cities to see three cartmen, each with a horse and a heavy dirt-cart, moving slowly in a line of march from the place of excavation to the dumping-ground, with only a few bushels each of earth. And yet every horse is hauling a heavy load. Were the three loads placed on a good farm-wagon, two horses would draw the same amount of earth that three take with carts; and they would perform the work with far less fatigue. Any intelligent teamster or engineer can perceive this fact without any argumentation. Then, if one man and two horses can cart the same amount of earth, after it is loaded, that three men, three horses, and three carts will bear, is there not an opportunity to exercise commendable economy in appropriating the available forces employed? We will suppose, for example, that two spans of horses will cart each 4,000 pounds. By employing a wagon a little stronger and heavier, and yet not so heavy as two wagons, 8,000 pounds, with only one driver and four horses, will cart a given number of tons at a much smaller expense than by employing several drivers, each with a horse and cart or wagon.

There are a great many kinds of manual labor which can be performed economically by one person. But as the number of workmen is increased, the amount of labor done in one day will be proportionately less. One joiner may perform a fair day's work, but ten joiners will scarcely do ten times as much. These considerations hold equally good in almost every department of manual employment. As the number of workmen is increased, the expense of performing a given job will be augmented.

THE New Yorkers are complaining about putting out the street lamps so early in the morning, that thieves have two hours' profound darkness in which to do up their nefarious work.

THE BEST ORNAMENTAL TREES.

[FROM THE HORTICULTURIST.]

IT has occurred to me that at this, the season for planting trees, some hints from a planter of twenty years' experience, who has studied somewhat the effect of trees in the embellishment of country places, might not be unacceptable to some of your less experienced readers. To the *veterans* in arboriculture, I have nothing to say, for the reason that it is quite probable that they could teach me.

One of the points least observed by young planters is the *habit* of trees, as regards coming early into leaf, and holding the foliage till late in the fall. What a valuable property is this, which gives us, in such trees, almost six weeks more of apparent summer than others; since no one can feel that summer or even spring has come, till the foliage of the trees is fully expanded. In the case of country places that are used merely as summer retreats, by citizens who pass eight months of the year in cities, this is not important; for, even the Catalpa and the Kentucky Coffee—those two *laziest* trees in the Northern States—will be in leaf by the time June and the citizens have saluted each other in the country. But, for those who live in the country all the year round, it is important that the scenery round the house, which meets the eye daily, should be composed mostly of what I call the reliable ornamental trees, for the Northern States—trees quite hardy, of excellent, persistent foliage, rapid growth, and other valuable properties, as regards foliage and form.

I. THE BEST FOLIAGED TREES.—*American Elm*.—By this I mean our native, drooping elm, which, though common in various parts of the country, can never be too common; and which, whether for grace, beauty, freshness, and depth of

foliage, or rapid growth, stands at the head of all trees that grow in this climate.

The Dutch, or Cork Elm, ranks next to the foregoing. It is even a more luxuriant grower, and, though by no means so graceful, is still a fine tree, with a mossy head of dark green foliage, remaining quite green till the frosts have stripped almost every other tree. The *English Elm* has something of the same habit, while the *Scotch Elm* (I believe all these are now in the nurseries) is more like our Weeping Elm.

The Negundo Tree; usually called the Ash-leaved Maple.—A charming, clean tree, with an airy and pretty habit of growth, forming a wide, rather than a lofty head. Its great merit is, the lively, cheerful tint of its leaves; which, being paler or tenderer in color than those of most trees, afford a fine contrast to elms and oaks. Hardy, a free grower, and very easily transplanted. It is one of the first to come into leaf; and its pretty, pendulous, light green blossoms, much like currant blooms, make their appearance to gladden the heart of the planter, even before the foliage.

Silver Maple.—A tree much planted and well known in Pennsylvania and New Jersey; very little known in any other of the Northern States. Certainly, it is the prettiest of the maples in its graceful habit, as well as the most rapid growing, though it has not the rich coloring of the Sugar Maple in autumn—the leaves dying of a pale yellow. The Sugar and the Soft, or Red-blossomed Maples, are also most deserving trees; but, when immediate effect is wanted, the Silver Maple should be planted in preference.

English Sycamore Maple.—A fine, hardy tree, which, I am sorry to say, is

yet by no means common in this country. Its fine, large and broad leaves, coming out early and hanging till late, make it a capital standard tree for the lawn or pleasure ground.

Weeping Birch.—A Scotch tree, very graceful in the landscape, with light, airy foliage and pleasing habit.

Weeping Willow.—In the Middle States this is a very valuable tree; at the extreme North, it is rather delicate. The very first tender green leaves that salute the longing eye, when winter is fairly past, are those of the willow, as well as the last that defy the frost in autumn. Very rapid growth and much grace of outline, are additional good qualities. Undoubtedly, the willow, like the Lombardy Poplar, should never be *abundantly* planted in any country place. Such marked and peculiar trees, like great generals, should never be made common and vulgar, by assembling too many of them in one *review*; though a few of them, certainly one or two, in a rural landscape, *tell* admirably. Where there is water in the scene—such as a lake, pond, or river—the willow, which so essentially belongs there, may be more multiplied. It is a mistake, however, to suppose that the tree will not grow in dry soil. In a good, deep, dry soil, few trees thrive better, or make wood faster than the Weeping Willow. It is only in *thin*, dry soil, that it fails.

Tulip Tree.—Though this can hardly be called an *early* tree, neither can it be deemed *late*, as its leaves come out soon after those of the maple; its great *elegance* of habit, and striking beauty of leaf and blossom, recommend it to every planter who has an eye for fine proportions. It is quite shy of removal when large; and I therefore recommend planters to choose small specimens, four or five feet high, from the nursery. Once established in deep soils, it advances with great rapidity; and, whether young or old, there are few finer things to gaze on than a tulip

tree, standing upon an open lawn, where it can expand freely on all sides.

The Common Chestnut.—I never see this noble tree planted; and the reason is, because it is one of the commonest trees in the woods: and yet, how few of us know how majestic and grand is a chestnut, grown on a lawn, where there is “ample room and verge enough;” where it can form a gigantic and massy head, like a great globe. Certainly, the American Chestnut is a more *beautiful* large tree than the oak; since to equal grandeur of proportions, it adds greater variety of tint. Few things are finer than a group of chestnuts in full tassel; and few trees afford a finer shade, or attain a large size more rapidly. If a little pains were taken to select the largest and finest nuts to sow, a great improvement might be made in the size and quality of the fruit.

The Purple Beech.—All the beeches are fine trees; but the true Purple Beech is a very valuable tree in the landscape, as its color is a bold contrast to the uniform green tint of most other deciduous trees. If the soil is well trenched, and made light and rich, and especially if dressed with wood ashes occasionally, it gets on pretty rapidly, and soon makes a figure, so that it is sure to be inquired about by the dullest observer.

Weeping Ash.—A striking ornament to the lawn or pleasure grounds, especially if grafted high; the foliage a good color, and the tree very picturesque.

The European Ash is a decidedly handsome and valuable tree—perhaps more ornamental in pleasure grounds, while under thirty feet high, than any of our American ashes. The *Mountain Ash* is a distinct tree, very ornamental in its coral berries during summer. It is not quite reliable, however, in its foliage, as it is apt, in light soils, to cast its leaves rather early in the autumn.

The European Larch may, I think, be safely put down as an ornamental tree of standard value in this climate.

Its buds expand early, and only late frosts cause the leaves to fall. It suits light and poor soils better than almost any other tree.

II. FINE ORNAMENTAL TREES WITH CERTAIN DRAWBACKS.—Among these, I should say, the Linden and the Horse Chestnut are the most conspicuous. Both these make very superb single trees in the park or pleasure grounds; and, upon the deep, rich soils—strong loams—they hold their foliage well all the season. In thin or light soils, especially if dry, they frequently become yellow early in the autumn; but, he whose planting is confined to such soils, will therefore not wholly deny himself the pleasure of planting such trees as these, only he will not plant them in the nearer and more highly kept parts of the scenery about the house. The Catalpa, the Locust, the Acacia, the Kentucky Coffee, and the Paulownia, all which expand their leaves quite late in the season—should also be confined to the walks of the pleasure grounds or the secondary groups of the plantations; I mean secondary, as regards the scenery about the house, so that the foreground, in spring, may not be made to look wintry still, by the presence of dead-looking trees, while all around are in full verdure.

I have said nothing yet about Magnolias, though they are the pride of our pleasure grounds. They must, however, be looked upon as *specialties*, requiring a little more attention as to soil and site, at first, than any other trees, though no more care after they are once established. They need a deep, rich, dry soil, *well drained*, and with about a fourth of well decomposed black earth, peat, or rather leaves, intermixed. The most easily cultivated and showy sort in its foliage and flowers is the Umbrella Magnolia, (*M. tripetala*;) the handsomest in its flowers, the Chinese white, (*M. conspicua*;) and the sweetest, the Swamp Magnolia, or *M. glauca*. These are all hardy wherever the Isabella grape will

ripen, and are certainly well worthy of a place in every garden.

Among really interesting ornamental trees, I must not forget the *Ginkgo*, or Salisburia—the curious tree from Japan, which grows almost as freely as a Poplar in the Middle States, and is quite as hardy. Nothing can be more unique than its foliage, or more interesting than the fact, that it stands midway in structure between deciduous and evergreen trees.

I ought to say something about Oaks; and I would do so, if I thought I could persuade your readers to plant them. But, American forests are richer in species of this king of trees than all the rest of the world; and, I suppose, for that very reason, Americans will not plant oaks—as yet. Perhaps, when the forests have become sparse, we shall more rightly value the different beautiful kinds, which not one in ten knows even by name yet!

There are, however, two species of oak, so distinct and so ornamental in plantations, that they should receive attention even now. One is, the *Overcup Oak* of the Western States, with fine large foliage and immense acorns; and the other, the *Willow Oak*, of New Jersey and the States south of it, with very narrow and distinct foliage. Trees of these may be had in many nurseries, and are worthy of a conspicuous place in the landscape garden.

I intended to say something about evergreen trees of merit; but, fearing to be deemed tedious, I leave it for another letter.

CORRECTION.—The very interesting extract in our last issue entitled “Ancient Marbles,” being a part of a correspondence with the *Evening Bulletin* of this city, was credited by mistake to “A. BREWSTER, Esq.,” instead of to MISS ANNIE BREWSTER. A Miss is as good as a mile. So just that much was our credit out of the way.

OUR AUSTRALIAN MAIL.

THE Sydney papers, *Herald* and *Mail* down to September 4th, have duly come to hand, containing much that is interesting as giving us an idea of the progress of the Tasmanian land. And first amongst the items we may place that which settles the value of that wonder we have heard of here.

THE AUSTRALIAN DIAMOND.—The great diamond has turned out to be a great sell. After being secluded from the public gaze till a considerable popular excitement had been got up, it was at last admitted to the inspection of a competent geologist, and after a few simple tests, it was soon pronounced to be no diamond at all, but simply a water-worn quartz pebble. Previously to this discovery, however, and while the real nature of the stone remained a mystery, it had become an object of sale and speculation. A company had been organized in Melbourne for its purchase, and a certain sum given for it with a further right to a share in its ultimately realized value. By dint of the ordinary means for getting up excitement, the shares were rushed to a high premium, the knowing ones cleared out, and the captured geese were plucked.

DESIGNS FOR THE PUBLIC FREE LIBRARY.—It is now fourteen years since the Melbourne Free Library—a noble institution, which of itself has made illustrious the name of the capital of the adjacent colony—was thrown open to the public, and the Victorian Parliament then set an example of enlightened liberality and public spirit worthy of our emulation. For years past the inhabitants of this city and colony have been eagerly desirous to see the establishment of a similar institution here: and their feeling on the subject was recognized by the Legislative Assembly

in a vote of £10,000 for the erection of the building.

The site is eminently suited by reason of its central position and extent, for the erection of a Free Library; and the building which Mr. Barnet has designed would be a conspicuous and a noble embellishment to that eminence which overlooks harbor scenery of great natural beauty. It is a fortunate circumstance for the public that the land adjoining the Museum is available, for a more suitable spot could not be selected; and the acquirement of land by purchase would probably absorb most of the money placed by Parliament at the disposal of the Government for the establishment of a Free Library. The site appears to have been intended originally for this very purpose. In the preamble to the Act to incorporate and endow the Australian Museum, (assented to by Sir Charles Fitzroy, on the 4th of July, 1853,) it is expressly stated that “it is deemed expedient, for public convenience, and *the promotion of literature and science, that the books, pictures, manuscripts, statues, specimens of natural history, and other objects which this colony now possesses, or may hereafter acquire by gift, bequest, purchase, or exchange, should be deposited in the custody of trustworthy persons, etc.* The “specimens of natural history and other objects” which the colony has acquired have afforded instruction and recreation to thousands; and there can be no doubt that when the “books, pictures, manuscripts,” etc., have also been acquired, the “public convenience” and the “promotion of literature and science” will be best consulted by their being placed in the edifice which it is proposed to erect by the extension eastward of the present Museum buildings. But what is of still greater importance than the beauty and suitability of the

site and its architectural adornment, is the fact that the design will be found to provide ample accommodation and facilities for the literary and æsthetic requirements of the community for many years to come. With the Museum are to be associated a Free Library, a spacious picture gallery, a gallery for sculptures, a lecture room, and in the basement story a commodious hall well adapted for an economic museum. The colossal proportions of the new wing of the Australian Museum seem to dwarf what by courtesy is still called the "main" building. Better days are, however, in store for it, since the new designs require the erection of another story, which will give it an altitude corresponding to that of the new wing, its architectural style also being made to harmonize with that of the College street front. This story will give an additional apartment to the Museum one hundred feet long by one hundred and sixty feet wide.

As already stated, it is proposed to place the library to the east of the present building; and between the library and the Museum there will be a central hall, approached by a bold flight of steps from William street, giving access to the library and reading rooms on the left, to the Museum on the right, and conducting to the sculpture gallery and through it to the picture gallery at the rear. A lecture hall is placed near the centre of the building adjacent to it and in connection with the Museum and the art galleries. The gallery for sculptures will be eighty feet long by fifty feet wide, while the dimensions of the picture gallery will be two hundred and thirty-five feet by forty-five feet. The picture gallery will form the southern enclosure of the quadrangle, the central space (intersected by the sculpture gallery) being reserved for open court yards. Provision is made for the accommodation of about a thousand readers at one time; and the shelves of the library will give space for one hundred

and sixty thousand volumes. A separate apartment will be apportioned to ladies; and there are lavatories, retiring rooms, and other conveniences for the public, as well as offices and quarters for the librarian and managing officials. The ground falls considerably to the eastward, and the basement of the new portion of the structure will afford ample accommodation for the establishment of an economic museum, with space for a school of design.

The style of the architecture is of the Roman character, but freely handled. The portico at the central entrance will be hexastyle, of the Corinthian order, and will be surmounted by a dome; and on either side of the flight of steps forming the approach there will be a large pedestal, suitable for groups of sculpture. Under the portico a covered way will conduct to the court-yard, and will probably be found useful for carts loaded with heavy goods. It is proposed to fill in the tympanum of the pediment with sculpture, and also to surmount the various parts of the parapet with statuary. Sculpture will be introduced in various parts, and spaces will be available for bas relief illustrating the purposes of the institute, the history of the colony, or other appropriate subjects.

The cost of this magnificent pile of buildings is estimated by the Colonial Architect at about £100,000; but the amount required to finish the northern end part of the eastern front is not more than £56,000, and of this sum, £25,000, which would be sufficient to carry on the works for eighteen months, is available, and it will probably not be necessary to apply to Parliament for a further grant for the next two years. The accommodation which would be provided by the completion of this portion of the design would give space for a library for one hundred thousand volumes and a reading-room for six hundred readers, together with librarian's quarters, offices, lavatories, and all other necessary ap-

pliances. One great fault of many of our public buildings is that they have a patched-up and an unfinished appearance, but so far as the Museum and the Free Library are concerned, the completion of the William street front would obviate that blemish, and further extensions of the plan could, from time to time, be made without in any way interfering with the portion completed and in occupation.

THE NEW IRON BRIDGE FOR BATHURST.—The great flood of '67, which swept away the old wooden bridge over the Macquarie, at Bathurst, will probably be regarded as one of the most disastrous events which have occurred in the Bathurst district. The loss of the old bridge, however, will soon be more than compensated for by a new one connecting Bathurst with Kelso. The new structure will be strong enough to resist the force of floods more overwhelming than any which have yet rolled down the bed of the Macquarie, and it will be adequate to accommodate the traffic for many years to come. We believe that the Parliament has voted £15,000 for this bridge, but the amount is not greater than required by the exigencies of the case, or than would be fully justified by the commercial importance of the "metropolis of the west." Within five weeks of the destruction of the old bridge, a temporary structure was erected; and it is likely that the new iron bridge will be in place in a much shorter time than that in which any work of similar magnitude has heretofore been completed. Most of our large iron bridges have been imported from England; but in the case of the Bathurst Bridge the heavy iron only has been imported. The whole of the labor has been performed by colonial workmen, and that, too, efficiently and well. As every fresh large undertaking of this kind is satisfactorily carried out by colonial firms, the chance of successful competition from abroad is proportion-

ately lessened, and remunerative employment for colonial brain and sinew assured.

The first span of the Bathurst Bridge is finished, and on its way to Bathurst, where it will be erected in about three weeks. A second span will be forwarded from Messrs. P. N. Russell and Co.'s yard in the course of a month, and the last span within a month after that. Unless some unforeseen circumstance should occur, the bridge will probably be opened for traffic within three months. A great quantity of the angle iron has been manufactured at the Pyrmont Rolling Mills specially for the structure. The Bathurst bridge will, when completed, be the largest iron bridge that has been made in the colony, and, on this account, as well as from the fact that it embodies the first application to bridge platforms of the principle of uniformity of stress in girder-work, some information respecting it will be read by many with considerable interest.

As will have been inferred already, the bridge consists of three spans of 110 feet each, supported on cast iron-piers, the total length being 337 feet.

The piers are formed of cast-iron cylinders, 6 feet in diameter, and in lengths of 6 feet, bolted together end to end, and forming columns or pillars of iron. They are filled partly with brick and cement, and partly with bricks and mortar. Cap stones fit exactly on the top length of the column, and the bed plates are strongly bolted to them. On these bed plates rest the saddles supporting the iron girders, and the rolling gear calculated to assist their expansion.

The two pillars of each pier are 24 feet 8 inches between centres, and are braced only at the top by arched beams, which also support the roadway.

The superstructure is formed of two main girders, each 110 feet long, 11 feet between centres of gravity of booms, and 2 feet 4 inches wide. Their ends are strongly riveted to cast-iron saddles, and

rest freely on the bed plates, deflexion and expansion being provided for by deflexion pins and expansion rollers. The particular form of girder applied to the Bathurst bridge is known as the "Murphy Whipple Truss." It is an open triangular girder, with ten triangles forming the web. The top boom or compression member consists of a horizontal plate with four angle irons, to which are attached long and narrow vertical plates, forming a section resembling the letter H. The bottom boom or tension member is formed of long and narrow vertical plates, to which the vertical struts and ties are riveted. As the strains increase towards the centre of the booms, the necessary sections of iron are provided by the addition of more vertical plates on each side, the length and number of these plates varying according to the distribution of the strains.

The verticle struts are formed of four angle irons braced together by lattice bars, and each diagonal tie is composed of two narrow vertical plates, with stays or lattice bars between them. As the strains on the web decrease towards the centre of the girder, the weight of the ties and struts is less there than at the ends.

The end struts, which are riveted to the saddle, are a continuation of the top boom, and the vertical plates in all the members are under 12 inches wide.

The vertical struts are 11 feet apart, and a double angle-iron bearer is fixed in the middle of each to receive the end of the cross girders.

The main girders of each span are 24 feet 8 inches between their centres, leaving a clear space for a 22 feet roadway.

Two footways, each 4 feet wide, were provided in the original design, but no contract has been taken for them at present. These footways would be supported on cantilevers riveted to the end of the cross girders; they can be put on at any time.

The cross girders without the cantilevers, are 27 feet 4 inches long, 1 foot 6 inches deep at the ends, and 1 foot 9 inches in the centre, and 9 inches wide. The web plates, and top and bottom plates, are each in one length, and the angle irons are also in one length, welded at the ends.

The platform to support the planking is entirely of rolled iron, and serves also as bracing between the two girders of each span; it consists of three longitudinal double T irons, 8 inches deep, one in the centre of the roadway and one on each side under the kerbs, and of diagonal iron bars of the same kind, but only 7 inches deep, riveted to the longitudinals at every 11 feet. Between these are also riveted diagonally two double angle irons 7 inches deep. All the diagonals are thus fixed to the centre longitudinal at one end, and to the side ones at the other end, starting from the centre of each span. They form a kind of double diagonal framing, on which the planking is fastened from under with coach screws. The necessity of bracing between the girders is obviated, and the whole of the platform is rendered so rigid that the strains brought upon it by a passing load are immediately distributed over a large portion of it, and the flexure resulting from deflexion thereby lessened.

The application of this principle is for the first time applied to bridge platforms.

The whole of the iron for the platform is rolled to double T and double L section; the joints are few and secured from moisture, and the planking being fastened from below, the oxidation and decay is much reduced.

The principle of uniformity of stress in girder-work, which is so often overlooked, has been carried out in its entirety in the design of the Bathurst bridge. Thus, in each main girder the load is divided between the two lateral divisions of the web, for the cross girders transmit to each part forming the

struts a uniform stress, which is then transmitted to each half of the web, the centre of stress in each part corresponding exactly with the centre of gravity.

The weight of iron in each main girder is twenty-one tons, or 3.8 cwt. per foot run of girder; that of each span, including cross girders and iron platform, sixty-six tons, or 12 cwt. per foot run of bridge. The cast iron in saddles and bed plates is not included in the above weight, and the wrought iron in the bracing girders over the piers is fifteen tons.

PUBLIC WORKS.—The works at the West Maitland Bridge are now quite finished, both approaches having been completed during the month. The traffic will be turned over the bridge immediately. The centre span of the bridge was tested last week with a load of forty tons placed in the middle. The total depression with the load was only one-eighth of an inch, and proved beyond doubt that the bridge is amply strong.

The coal staiths at Newcastle have made fair progress since last report. The whole of the timber work is nearly finished, and all the iron work, except the short gear for shutes No. 1 and No. 2, is in place. The permanent-way material having arrived in Sydney, preparations are being made to have the rails laid at once. A contract has just been let for levelling all the earthworks and forming the approaches to the shutes.

During the month, the first of the screw moorings has been put down in the harbor at Newcastle, between the wharf and Horseshoe. Considerable difficulty was experienced in getting it down, owing to the bottom being entirely composed of a very stiff, tenacious clay. It has been screwed down twelve feet, at which depth it must be on the rock. The most powerful steam-tug at Newcastle, one hundred and sixty horsepower, was secured to a ship moored to the screw, and set full speed astern for about ten minutes, without having the

least effect on the mooring. Other screws will be put down at once to complete a system of head and stern moorings for ships in the Horseshoe and North Harbor.

The Southern Breakwater is making satisfactory progress, some large gaps having been filled up and repaired during the month.

Satisfactory progress is being made with the erection of the new Post Office. The whole of the building is up to the first floor, with the exception of a small portion of the George street elevation, and the walls at the back are advancing towards the second story. The ten polished granite columns supporting the arcade on the north side of the edifice are in place, and workmen are now employed in carving the foliated capitals which are to surmount them. The capitals of the pilasters on the inner wall of the arcade and the cornice to the ground-floor are also completed. The sculptured spandril representing the Arts and the Royal Arms over the central entrance are nearly finished, and several other sculptured spandrils are in hand. Two of the polished granite columns in the George street façade, with Corinthian capitals, are in place; and the Italian capitals to the piers are carved. The other granite columns are being polished. The building at the back comprises workshops for the telegraph, with stables and other offices in the basement, and this part of the structure is well advanced. The part of the building already completed contains many handsome examples of sculpture, and the effect of the whole is extremely beautiful and pleasing. The upper portions of the Post Office will probably be erected quicker than that which has already been done, as the work will be less difficult and tedious. When finished, the building will be one of the finest specimens of architecture in the colony—a credit to the city, and a monument to the ability of the Colonial Architect by whom it was designed. We

believe that at present provision is made for only a footway along the northern side of the building, twenty feet wide. This lane, however, will be quite inadequate to the requirements of the public traffic; and it can scarcely be expected that the Government, which has shown such munificence in the erection of a building of great public importance, will permit it to be obscured by the shadows of dingy warehouses and back premises of less presentable appearance. In no part of the city is a thoroughfare of at least the ordinary width (sixty-six feet) more needed; and the corporate body, as well as the citizens generally, would do well to bestir themselves for the attainment of so desirable an improvement.

ONE GOOD TURN DESERVES ANOTHER.

A TINKER was travelling in a country town, and having traversed many miles without finding anything to do, he stopped, weary and hungry, at a tavern. Here he got into conversation with a glazier, to whom he related his troubles. The latter sympathized with him deeply, and telling him he should have a job before long, advised him to go into his dinner and eat heartily. The tinker took his advice, eat his fill, and when he returned to the bar-room, he was overjoyed to hear that the landlord required his services to mend a lot of pans and kettles, which had suddenly "sprung a leak." The tinker at once fell to work, accomplished the task, and received a liberal sum therefor, and started upon his way rejoicing. Upon reaching the outside of the house he found the glazier, who said:

"Well, you see I told the truth. I procured you a job of work; and how do you think I accomplished it?"

"I am sure I cannot tell," replied the tinker.

"I will tell you," rejoined the glazier.

"You told me you were weary, hungry, and penniless. I knew the landlord was well off and doing a good business, so I watched the opportunity and started a leak in every tin vessel I could get hold of."

The tinker, with many thanks and a heart full of gratitude, resumed his journey; but he had not proceeded many yards before he reached the village church, when a brilliant idea struck him. The glazier had befriended him—he would befriend the glazier. The church, he thought, could afford to bear a slight loss in a good cause, so taking a good position, where he could not be seen, he riddled every window in the edifice with stones, and then, highly elated with his exploits, he retraced his steps to notify the glazier he would speedily have a very important job. He met the glazier at the door of the tavern.

"Sir," said he, "I am happy to inform you that fortune has enabled me to return the kindness I received from you an hour since."

"How so?" asked the glazier, pleasantly.

"I have broken every pane of glass in the church," answered the tinker, "and you of course will be employed to put them in again."

The glazier's jaw fell, and his face assumed a blank expression, as he said in a tremulous tone, "You don't mean that, do you?"

"Certainly," replied the tinker; "there isn't a whole pane of glass in the building. One good turn deserves another, you know."

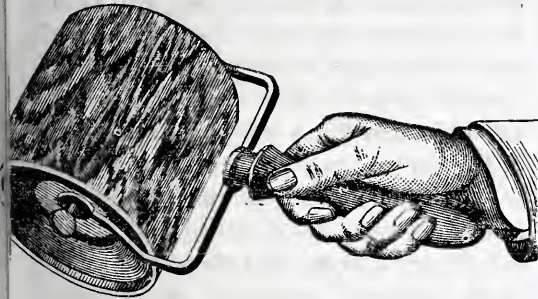
"Yes," answered the glazier, in a tone of utter despair; "but, you infernal scoundrel, you have ruined me, for I keep the church windows in repair by the year!"

A light gray marble of good quality has been discovered about five miles from Louisiana, Pike county, Pennsylvania.

EUROPEAN NOTES.

ONE of the most useful and interesting of our London exchanges is *Morgan's British Trade Journal*. Looking over its pages of a late issue we were struck more than ever with the triteness and truth of the good old saying—"There is nothing new under the sun," for there we found the following notice, duly illustrated, of Adam's Graining Machine, which is the invention of a citizen of Illinois, and has been in use these two years in this country:

BELLAMY'S PATENT GRAINING TOOLS.—Messrs. Brodie and Middleton have introduced a new feature in ornamental painting, the patent of Mr. Bellamy.



The apparatus consists of a Frame and Revolving Cylinder, the figure of the wood to be represented being cut on the surface. Patterns of Mahogany, Maple, Oak, Birch, Tulip Woods, and every description of Marbles have been prepared, and the work produced is of an eminently satisfactory character.

We also detect another appropriation in the following, being nothing more nor less than Osborn's Patent Photo-Lithographic Process, so well known in New York.

PHOTO-LITHOGRAPHY.—From the *Press News* we learn that Messrs. Whiteman & Bass, copper-plate engravers and lithographers, of High Holborn, have recently introduced into their business a novel feature, which they describe as the photo-lithographic process, by which

means original drawings, etc., may be reproduced, and an unlimited number printed at much less cost than by the ordinary method of copying on stone, besides ensuring photographic exactness. The size of the original is of no consequence, as it is enlarged or reduced and lithographed at one operation. It is particularly adapted for architectural, engineering, and mechanical drawings, pen-and-ink sketches, etc. Speaking of this new process, *The Building News*, which adopts it for its lithographic illustrations, observes:—"Architects sometimes complain, and with justice, that their drawings are not fairly reproduced by the wood-engraver or the lithographer. When one man draws on wood or on stone from another man's drawing, some of the spirit or substance of the original evaporates in the translation. It is, in fact, another man's work. Architects cannot, however, complain of engravings produced by the photo-litho process, as it is nothing more nor less than their *own drawings*, line for line, and dot for dot, slightly reduced. Of course a vast deal will depend on the drawing and the manipulator. One photographer will take a better likeness and produce a better picture than another photographer, and one man's face is more easily taken than another man's face. So it is with the new process of photo-lithography; if the original drawing be good, the reproduction will in all probability be good. The frequent appearance of illustrations obtained in this manner will introduce to our readers that picturesque and charming variety which all admire. Messrs. Whiteman & Bass, our lithographic printers, have made special provision for this kind of work, and all who are familiar with our pages must admit that they do their work well." By this new process maps or plans are faithfully

enlarged or reduced to any size, with all the exactness of the original proportions, to say nothing of the vast saving in time and cost of the reproduction. Drawings made especially for reproduction by this process should have well-defined black lines, and should not be shaded with flat washes. Colors should be avoided; smooth paper should be used; the drawing should be about twice the size of the intended lithograph, as the lines thin and sharpen by reduction."

SENSATION TOY.—A new toy has made its appearance—one of those which amuse big children as well as small. Its sale in Paris is fabulous, in London very moderate. In France it is called *Ménagez-moi jeune homme*: in England it has no special name as yet. It is a little tube made of osier, into which one can easily introduce a finger at each end. But the fingers once in, it is very difficult to get them out. It is impossible to get them out by pulling, for the harder one pulls the more does the tube contract and tighten on the finger. It thus forms an amusing species of handcuff. It is bought so eagerly in Paris that there are hawkers who, in defiance of the law, proffer it to you in the streets. A few days ago, on the Boulevard des Capucines, a policeman succeeded in arresting one of these hawkers as he was carrying on his illicit commerce, and walked him off to the nearest station. But even a policeman is only a mortal like ourselves—a victim to most human frailties, and amongst others to curiosity. At the corner of the Rue Louis le Grand, the agent of the authorities could not help inquiring from his prisoner what possible use there was for these little tubes. "Oh, it's very simple," said the street Arab; "I'll show you, if you like." "The best of us live and learn," majestically rejoined the representative of order; "show me." With great complacency the hawker explained to the policeman that he was to

introduce his little fingers firmly into the ends of the tube, and, having done so, to pull hard. The policeman was soon handcuffed, and Monsieur the Hawker took to his heels.

A NEW LIGHTHOUSE.—An important lighthouse has been recently built on a line of rocks which divides in two separate channels the mouth of the Loire. This line of rocks, named the Banche, is four and a-half miles long and one mile wide; the depth of water is only three feet to fifteen feet at low tide, and a great many ships have been destroyed in that place. There were many difficulties in building there a lighthouse; the rocks are distant nine miles from Pouliguen, the nearest harbor, and it was impossible to return to this harbor at each tide. It was necessary to keep the boats moored near the rocks in a most dangerous situation. The waves break so violently over these rocks that, except in very fine weather, the approach of the bank is only possible in a narrow place to the north. It was at first intended to build the tower in that place, but the ground was not there of a sufficient hardness to support the foundations. The solid ground was to be found only at one hundred yards distant toward the centre of the bank; it was necessary to build with stone and cement a temporary dyke of this length, supplied with a tramway for the conveyance of the materials from the boats to the tower. Even at that place the surface of the rock was so much broken and so bad that it was necessary to level it at six feet or seven feet below low-water mark. The hole was then surrounded with a cement dyke, the water was pumped out, and the hole was filled with Portland cement concrete. After many difficulties the masonry work was raised above high-water mark, and the tower then built speedily. All the work was complete in four years. The height of the tower is eighty-seven feet; it is entirely built of granite ma-

sonry; the floors are of wrought iron and bricks, and there is a cast-iron staircase. The volume of masonry is 4,500 cubic feet, and the pressure on the foundations is twenty-three pounds per square inch. The total expense has been £14,972. A metallic structure would have been most probably cheaper, and taken a shorter time for the construction. There were such difficulties to be met with that it was not possible to find a contractor for this work, which has required a great deal of boldness and patience in its performance.

THE NORTH SEA CANAL.—The preparatory surveys of the canal from the North Sea to the Baltic are at present terminated. The work is not to be entrusted to a private company, as was at first contemplated, but is to be executed at the cost of the State. The cost is estimated at thirty millions of thalers. Branch canals are to be united to the main line in order to increase its commercial value. The date at which operations will commence is not yet fixed, but it is not expected that it will be available for large vessels before six or eight years.

THE CHANNEL RAILWAY.—The final experiments with M. Boutet's bridge will shortly be made in Paris, and as invitations are to be issued to the principal engineers of France, and to many in this country, no doubt need be entertained that its merits and defects will be thoroughly investigated. The sole question to be settled is the solidity of the structure, for in its construction there is really no practical difficulty. The piers (says the *Mining Journal*) will be floated into their required position, then submerged, and screwed into the rocks at the bottom of the Channel by means of powerful submarine drills. The main structure is to be entirely composed of iron cables strung tightly across each pier, and worked together with close crossings of the same mate-

rial; the spandrils of the arches will form a sort of cross lattice bracing, and are said to add considerably to the support of the whole bridge. The total cost of the bridge will not, it is estimated, exceed £3,000 000, and it is confidently believed that in little more than two years from the date of the commencement of operations the bridge may be got into actual use. Seeing the great engineering operations which have recently been successfully carried out, there is really nothing so very visionary about M. Boutet's project.

AN ORIENTAL PALACE IN PARIS.—The liking for foreign ways, so often acquired by those who travel, has only recently began to show itself in France, where comparatively few of the population have any fancy for travelling. A well-known French diplomatist, however, who has been long in the East, but contrives to get a leave of absence every two years, and always spends his holiday in Paris, is trying his best to give something of an Oriental character to his Paris home. Being the owner of two large adjoining houses, he has obtained a lease of the upper floor of a third, also adjoining, and has managed by throwing down walls, raising roofs, and otherwise changing the upper floor of the three houses, to create for himself a vast, commodious, and luxurious apartment, with very large rooms, fitted up with as much of the Oriental taste and arrangement as Paris will admit of. The lower stories of the three houses are let off in flats, according to French ways; but the diplomatic notoriety in question has made for himself, on the ground floor of one of them, a sort of entrance hall, from which an "ascensor" raises his guests up to his habitation. The centre of the aerial dwelling is a vast oval room, with walls and roof of glass, surrounded by an immense conservatory filled with the flowers and foliage of the East. The tasteful iron pillars surrounding this room are hung with

magnificent creepers. Water is brought up to reservoirs, supplying a couple of fountains; and as the hall and the adjoining rooms are filled with Oriental furniture and ornaments, and the Count has brought home a number of Eastern servants, and offers rare tobacco to his guests, in "narghiles" and "chibouques," with coffee and sherbets *à l'Orientale*, those who visit this curious abode seem to be suddenly transported into some scene of the Arabian Nights. At a small dinner-party given by the Count a few days ago, the fare was as costly and original as the rest of the arrangements. Two pairs of *sterlets*, just arrived from Russia, were solemnly exhibited to the guests, swimming about in a tub of the water of their native Volga; a barrel of which had accompanied them on their journey, as the fish in question die immediately on being put into any other water, their trough being replenished from the said barrel every day. An hour after the fish had been thus exhibited to the admiration of the guests, the rare and delicate fishes were served on the dinner-table, cooked *à la Russe*, with a wonderful green sauce, into whose composition a good deal of red pepper seemed to have entered. The dining-room of the curious habitation in question is panelled with *plaques* of iridescent porcelain, containing charming groups of fruit and flowers—a novel and very effective style of ornamentation. One of the glories of the dinner-table was a set of Venetian decanters and glasses—imitations of the old, priceless creations of the fifteenth century, from Murano, where Dr. Salvatè so skilfully reproduces the wonders for whose manufacture the Queen of the Adriatic was formerly so renowned. Murano has had the honor of furnishing a great variety of exquisite things in imitation of the old Italian glass to Queen Victoria, to the Empress Eugenia, King Victor Emmanuel, and nearly all the crowned heads and grandees of Europe.

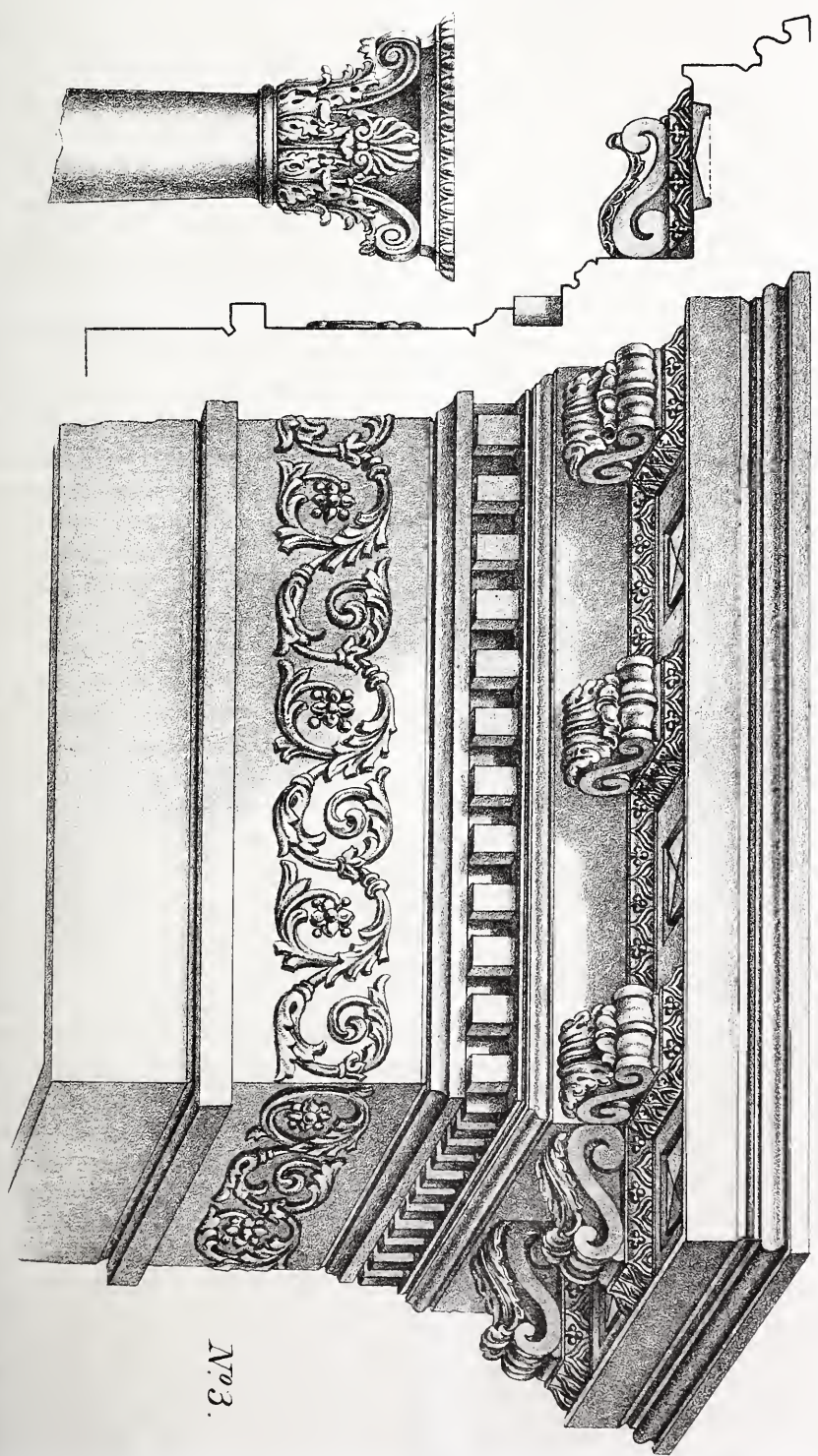
METHOD FOR CROSSING STREETS.

We find the following notice of what appears to us to be a feasible idea, and one which must attract the attention of the New York community, in the *Scientific American* of November 13th.

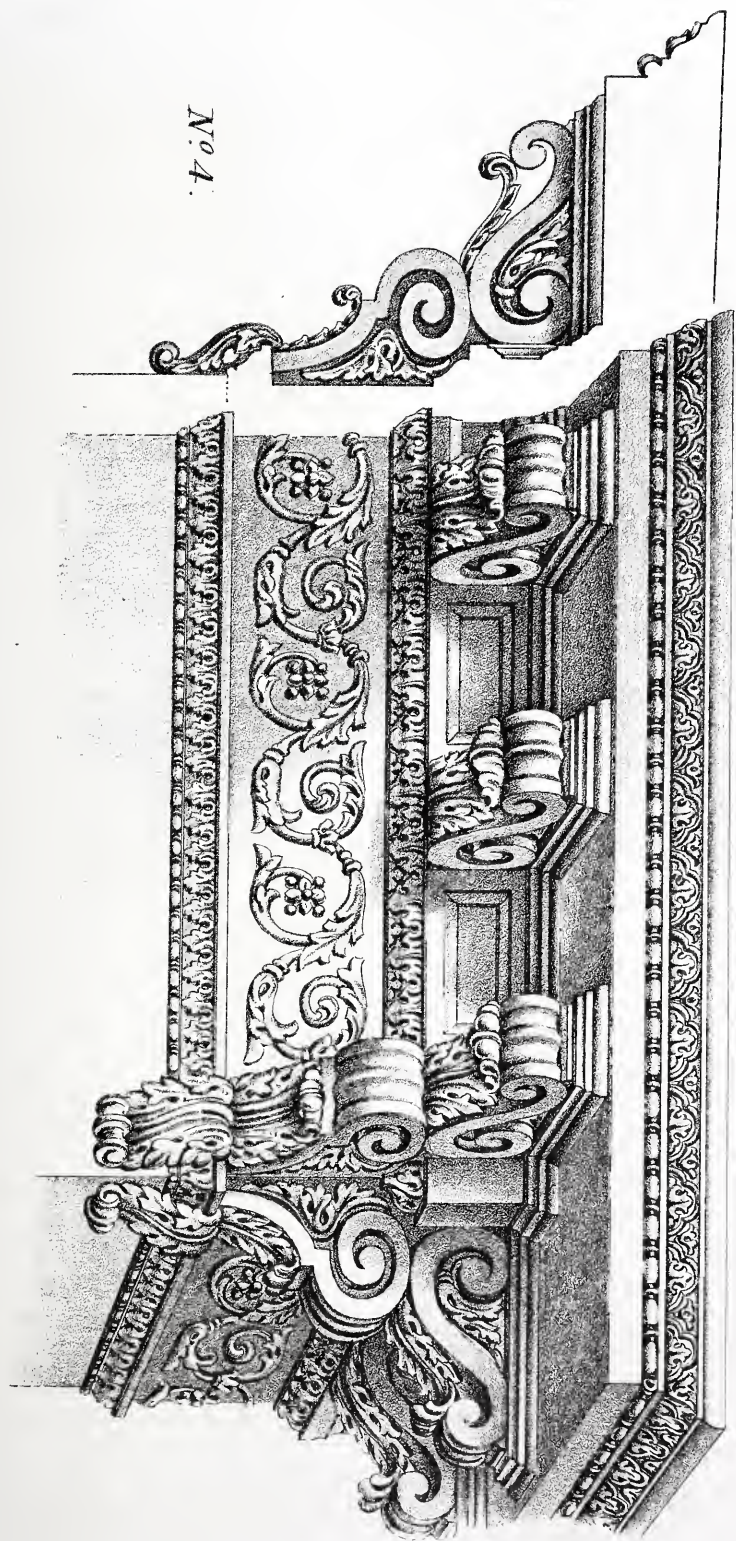
"METHOD FOR CROSSING STREETS.—Messrs. Adam and Nicholas Barth, of New York city, have submitted to us a plan for street crossing, which is perhaps worth consideration. It employs the principle of the elevator, with horizontal elevated rails to convey the platform from side to side. Passengers step upon the platform, are raised to the proper height, conveyed across, and let down upon the opposite side of the street. Mechanically this is perfectly practicable, and it might prove more acceptable than bridges. The plan is certainly free from some of the objections raised against bridges, though it might be found on trial to have some defects which the bridges do not have."

Of course two of these moving viaducts could work parallel and in opposite directions; thus sustaining a constant intercourse with each side of a street. The great objections to the Loew bridge were the trouble of ascent and descent by dirty steps, and the obstruction to travel by knots of standing sight-seers, not to speak of lingering loafers and watchful pickpockets, who were ever and always there to ply their trade. These objections would be overcome by these locomotive viaducts, and the dangerous thoroughfares of crowded cities, like New York, be rendered passible without personal exertion or risk.

VARNISHES FOR MAPS, CHARTS, ETC.—Two parts of spirits of turpentine, with one part of Canada Balsam, when thoroughly mixed, make a very good varnish when the paper has first been sized over with a solution of gelatin in water, to prevent the varnish from striking through.



№ 3.



QUERIES AND RESPONSES.

F.—Chimney flues are most shamefully neglected in the building, or rather the “running up” of new blocks on speculation. There are whole streets in this city having the most dangerous make-shifts for flues; and the great wonder is that conflagrations are not of more common occurrence in Philadelphia. In most cases the one flue answers the requirements of the half a dozen stove-pipe holes of adjoining houses, and yet it is only *four inches wide by twenty-four inches long*; the party-wall being but twelve inches, or brick and a half thick, with no chimney-breast to allow of a wide flue. And not alone this, but the flooring joists run into the party-wall, and the occurrence of a flue makes no difference!

In these houses referred to, when several stoves are in use, in cold weather, the smoke that fills the apartments at each side of the party-wall is most insufferable; and as it penetrates between the joists, it tends to ruin carpeting, as well as to keep the inmates of such houses in a constant state of excitement and fear. Did the insurance officers look into this matter, they would not insure such houses: Did the Building Inspector do his duty, such a state of things could not exist.

OUR attention has been called to an article on “the Water Question,” in our October number, in which severe reflections were made on the manner in which the water department of the city of Philadelphia is now conducted. The proprietor would express his sincere regret at their appearance in his magazine, not only because he has no sympathy in the views of the writer of the article on the point alluded to, but also because they were personal and partisan; for whilst an intelligent, fair, and manly criticism of any public work will

always be suited to our columns, any article falling short in either of those requirements, can only accidentally find a place therein.

We need hardly add that for the gentlemen now in charge of the water department we have, both personally and professionally, the highest respect.

C. M., Trenton, N. J.—It is not a bad plan to coat stone walls with plaster and rough cast, provided it is perfectly done; but if not executed in a workmanlike manner it breaks away, and not being capable of repair, soon presents a sorry appearance. First plaster the wall all over with lime and hair mortar. When dry, add another coat of the same, laid on very smoothly. This latter coat, whilst being put on should receive the rough cast. That is, a second man should follow up the plasterer with a pail of gravel and fresh lime, mixed with water to the consistency of a semi-fluid, splashing on the same with a wooden shovel, made for the purpose; and then going over the work with a whitewash brush, so as to leave all even. The rough cast may be colored if desired.

Another method is to dash the surface of the newly laid plaster with gravel, broken stones, broken earthenware, scoria, spars, or other material, well sifted or screened previously. The effect of surfaces of this kind is very good and very durable. Rustic cottages can be made to look uncommonly well with rough cast. For yard walls, where protection against the visitation of climbing boys is sought, we know of nothing more effective; presenting a surface that would daunt the courage of any aspiring youth. If, moreover, the coping were topped off with mortar, well sprinkled with broken bottles, the guardian effect would be insurmountable.

A correspondent writes us:

EDITOR ARCHITECTURAL REVIEW.—Sir: I am told that Robert Riddell, author of a popular work on Hand-railing, has been dead six years. If so, will you please tell me how it is that there have been editions of the work published in 1868 and the present year with his name signed? The last edition has a preface dated September, 1868, with his name attached. The same party tells me that the book is made up of principles from other authors, and there are other better books published on the subject.

Please let me know through the "REVIEW" whether these stories are true or false, and your estimation of the book referred to.

E. E.

We answer that ROBERT RIDDELL is still on the land-side of Eternity, having put in an appearance in our office very lately. This fact will answer for his name being affixed to the edition of his work dated 1868.

As to the work in question—*The Carpenter and Joiner*—we can only say that it is as original as any book can be that unites new ideas with the well-tried principles of experience in the past. Nicholson was the first author of any practical value on this subject, and if Riddell borrows from him, he shows his sense; and if Riddell adds to his accumulated knowledge by fresh ideas of his own, he shows his originality and worth.

In its line, there is no better book than RIDDELL'S *Carpenter and Joiner*; and this we would say, even if he were really dead, not merely defunct by supposition. For, his book will live. We thank E. E. for his kindly appreciation of the REVIEW, and will endeavor to retain his favor together with that of our many friends.

S. M. T., SALINA, N. Y.—Encaustic tiles may be easily procured. New York city is your nearest and surest market.

MARYLANDER.—We agree with you that it would be far wiser and more in keeping with the character of Mr. Peabody, for Baltimore to honor him, not with a hundred thousand dollar statued monument, but with a building for the use of the laboring classes, such as he would himself in his philanthropic wisdom erect. Such would indeed be a fitting monument to such a man, far more appropriate than any gaudy display of sculptured art, even though bearing his honored name. Let vanity give way for once, and common sense and utility proclaim the man to posterity.

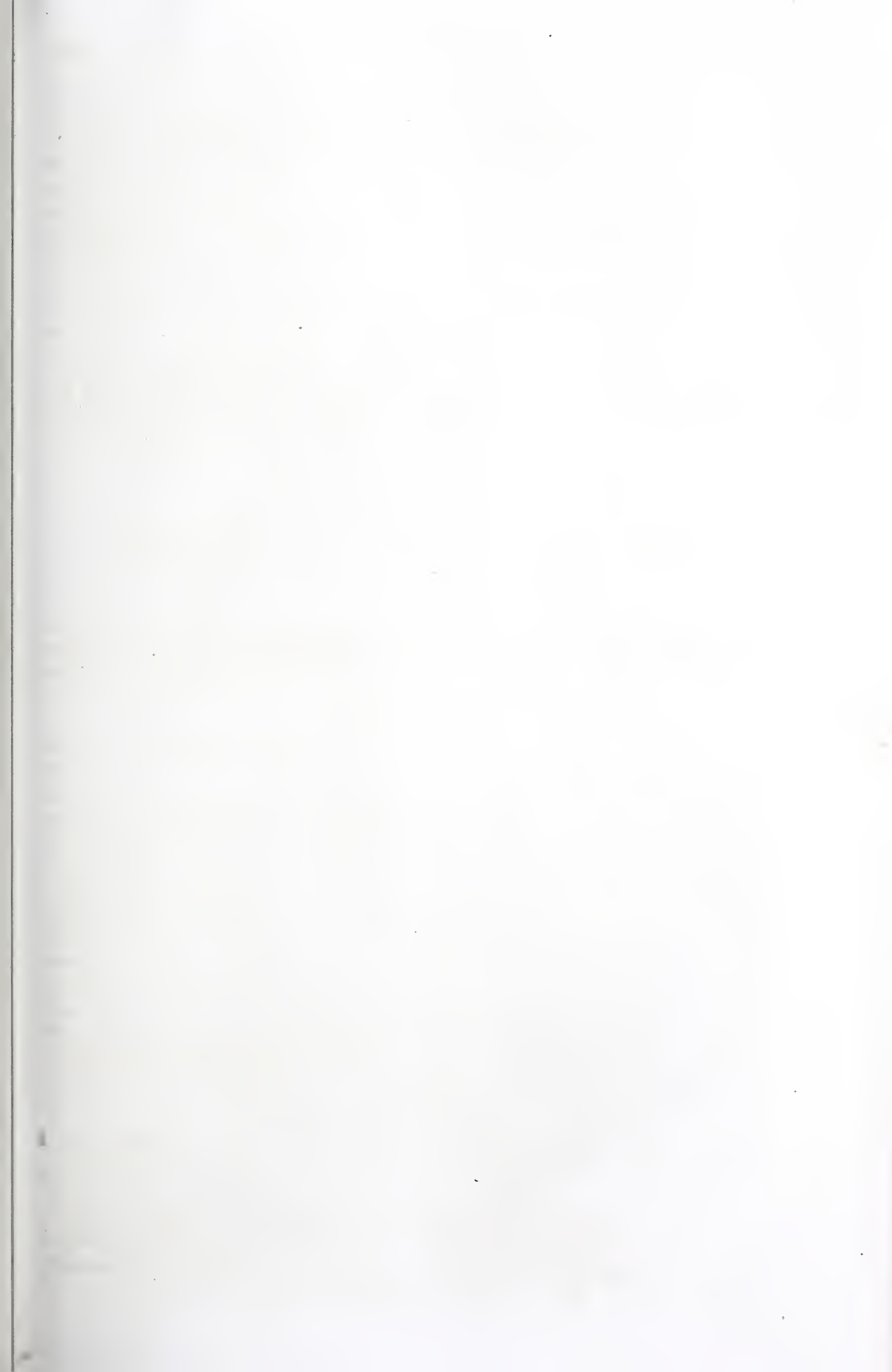
OBSERVER.—We have remarked that some of the journals make the slip of noticing our magazine as the *Agricultural*, instead of the ARCHITECTURAL REVIEW. The difference is that we would cultivate above ground, whilst the agriculturist would cultivate below ground; but it all comes to a question of taste, either way, whether it be *porticos* or *potatoes*.

JUDEA.—You are mistaken; Solomon's Temple was not equal in dimensions to many of our ordinary city buildings. Its plan was a parallelogram of about 110 by 37 feet. The height of the cell, or middle part, was about 55 feet, and that of the portico, which stretched across the whole front (37 feet), was about 37 feet. It was in the richness and splendor of its finish, rather than the greatness of its dimensions that Solomon's Temple was wonderful.

F. L.—Anything new in the way of scaffolding is in order, provided it be easily adjusted and strong.

L.—Bull's-eye glass is as scarce now as plate glass was when the former was plenty.

N.—Employ an architect, by all means. If you do not, you will rue it. The problem is a difficult one.





THE
ARCHITECTURAL REVIEW
AND
AMERICAN
BUILDERS' JOURNAL.

MONTHLY REVIEW.

EIGHTEEN SEVENTY.

JANUARIUS, that double faced son of Janus, that, like his sire, looketh from his initial stand-point either into the past or the coming year, is here at his post again, and dwells upon the things already done, or what is yet in prospect, in ARCHITECTURE, as in other matters.

That there is decided proof of progress admits of no doubt, especially when we scrutinize the estimates of outlay on buildings in the numerous cities throughout the several States of the Union, which have been erected during the past twelve months. And not alone the cost, but the style of execution which shows on every side, and rises as it were in witness of the efforts at advancement made.

The General Government could not be expected to do much; for, the National Debt which hangs so heavily upon its energies, and which it takes every effort to get gradually clear of its depressing nightmare-like influences, offers an obstacle to public works sufficiently great to excuse much advancement on the part of the powers at the Capital. But, notwithstanding, the national hand is seen occasionally in many places. The Treasury Building is at last completed at Washington, and that great work, the New York Post Office,

is driven forward day and night; Nature's Sun affording light by day, and Art's Calcium doing that duty through the dark hours of the night. The Corner-stone has been duly laid, and all now goes on with admirable system, steadily advancing to develop the architect's design: or, may we not more properly say—the conglomerate of designs? What the actual appearance of the New York Post Office will be is a question buried in the portfolios of the appropriate bureau at Washington, and subject to the discriminating touches of changing fancy during the progress of the labor which shall bring it forth to be gazed upon critically by the eyes of man.

Minor post offices and custom houses combined, and all of one inveterate phase, creep up and make themselves quaintly manifest in free stone or granite, as the case may be, and there, as far as Architecture is concerned, the present exertions of the Government are confined.

State works are more numerous. New York, Illinois, and Iowa are now erecting capitols, and South Carolina is finishing hers.

Municipal structures are not numerous. Philadelphia is about to commence a City Hall on an extensive scale, and

to that end is preparing working models and every fitting arrangement which may tend to secure a municipal building in all things worthy of the favored city of Penn.

Ecclesiastical Architecture is, as it ought to be, in advance of Civil; and churches and kindred structures bless the land in all its parts. In connection with this department of our art, we may mention the YOUNG MEN'S CHRISTIAN ASSOCIATION building of New York, which was duly dedicated to its good work last month, and which is a costly and attractive monument of the pious

and philanthropic energy of its founders and contributors.

In Domestic Architecture, the competition of trade, the emulation of wealth, the desires of vanity, are all incentives to a constantly increasing effort to surpass in the present the work of the past; and consequently, new stores and splendid dwellings will arise in the year we have entered on, which will quite eclipse those of past years; robbing the just now bye-gone EIGHTEEN SIXTY-NINE of its well-earned lustre, to emblazon the coming record of the passing EIGHTEEN SEVENTY.

NOVELTY IN ARCHITECTURE.

HAD the Grecian architects been content to simply copy or transfer the compositions of Egyptian art to their designs, instead of culling from and improving on them, we should to day have a very monotonous mode of building in every grade of the science. Against such a stultification of taste the fresh and vigorous intellects of the Grecians prevailed, and thought controlled by innate genius successfully urged on that mighty art-reform which gave to the world an unsurpassable style of ARCHITECTURE.

Can there be a stronger testimony of the advantage the world gains by progressive effort? Then why should we in our day be so scrupulously imitative of bygone modes and styles, limiting ourselves in all things to the very letter of the composition we take for our guide? If the Grecian architects struck out for themselves a new path, why not follow so triumphant a lead and assume an original position, untrammelled by "eras" and "ages," and dates of early days of design, when art had not a thousandth part of the educational advantages it now possesses?

Why are our pencils to be always

held to the slavish observance of the thoughts of other times and other men? Have we no judgment, skill, or inventive power of our own? Is the light of architectural design to be always borrowed from ever-growing distance? Must the past, merely because it is past, always dictate rules for the present?

These are questions well worthy of the careful consideration of our profession—questions which touch the vitality of art in our day. For, if we are merely students and followers of dead masters, when are we to assume to be masters ourselves?

The first idea which seems to urge itself on the critic in our day is "conformity to some one style, and some certain date of such style;" any commingling of dates of style, however judicious otherwise, is frowned upon as "bad taste," and "want of skill." The Chronology of Architecture being a study in which he that would design to meet the merest requirement of knowledge in his profession must be thoroughly posted. To meet this stern demand of the critical, authors are not wanting whose erudition is turned to account, and costly books, highly illus-

trated, burden the shelves of the professional bookcase.

In the composition of his design how often does the Architect feel a desire to insert the ornament of one era on the face of another, because it would be (in one sense) fitting. But that dread of being "caught tripping" compels him to relinquish reluctantly the desirable induction, and be satisfied with the compulsory course which critical acumen points out. So sensitive are architects of the frown of criticism, that they pre-

fer spoiling their composition by following the rule they cannot but feel rebellious against, rather than adopting their own natural tasteful inclination, defiant of the bug-bear awaiting them.

We do hope that, in spite of the stolid prejudice of the would-be critical, and the fears of the timidly correct, that Modern Architecture will yet assume an independent position with regard to the past, and that genius will assert itself in future NOVELTY IN ARCHITECTURE.

BÉTON AGGLOMÉRÉ.

WE have more than once called attention to that most interesting subject, THE MAKING OF ARTIFICIAL STONE, and have reason to know that it has its thinkers, and its observers, who do not yet think, but listen and note. The thinking portion of our practical readers occasionally experiment on the subject, and the simply observant wistfully watch the result of their labors.

It is true that we have had some unsuccessful efforts to produce artificial stone; but the very failures have in them so many incentives to still further efforts, that they but make way for the coming success.

Knowing then how generally interesting is this subject, we gladly seize on every additional piece of information which may add to the existing stock, and now present the following, from the *Engineering*, a well-known London scientific journal.

For about twelve years the "Béton aggloméré" of M. F. Coignet has been employed in France, at first sparingly, and with hesitation, but of late so largely and with so much confidence, that many of the large works in and near Paris have been constructed for the most part, or entirely, with this material.

So early as 1850, M. Coignet had experimented further than his predecessors Fleuret (1800) and Lebrun (1829), but the conglomerate he then produced was unsatisfactory. In the commencement he employed a crude mixture of coal cinder with lime, and subsequently he substituted sand for the former ingredient, and mixed it with powdered lime, moistening both together instead of wetting the lime as he had at first done. The second process to which he arrived, after modification and a long series of experiments with materials from different districts, and under varying circumstances, to ascertain the best proportions, is the system which has now grown into such a vast industry, and which bears his name.

The béton Coignet is a mixture of a large proportion of sand with a small proportion of lime, to which is added a percentage of cement varying with the amount of hardness or the rapidity of setting required. Only a very small quantity of water is employed to moisten the lime and sand. Thus tempered the mass is reduced, in a grinding mill, to a stiff paste, and is introduced into moulds of any desired form, being then subjected to the action of repeated and heavy blows. By this means it is thor-

oughly agglomerated, and the mould being almost immediately removed, the béton, shaped to the desired figure, shortly becomes set, and acquires the hardness of stone.

The material thus mixed and compressed under the hammer, when placed in the mould, receives a weight, strength and density which renders it a thoroughly trustworthy building material. On the average 1.31 bushels of component parts, sand, lime, and cement, make a cubic foot of béton, which will weigh about one hundred and forty pounds, and offer a resistance of some two and a half tons per square inch, while ordinary mortar, formed of the same constituents, will exhibit very insignificant powers of resistance. The difference arises principally from the difference in manipulation; in mixing mortar an excess of water is always used, which is distributed throughout the mass, and separates the particles of lime and sand, retarding the setting, and when after a time the water evaporates, it leaves the mortar more or less porous.

Theoretically, the Coignet process fills all the necessary conditions, and produces a perfect béton, the sand and lime being moistened with a minimum of water, and mingled as intimately as possible. Besides the thorough cohesion of the particles induced by the mixing and compression, the small quantity of water used makes the setting more rapid and more uniform.

In all cases the lime used should be hydraulic, in fine powder, and well screened, to free it from lumps; for if there are any lumps admitted into the béton they swell when the mixture is diluted, and weaken the material.

The cements used are always, if possible, heavy and slow setting. The quantity used is proportioned to the rapidity of setting required, and the hardness of stone which it is sought to obtain. For the third ingredient river sand, mingled with small pebbles, is the

best. If the pebbles are large, the concrete produced is rough and unsightly; if it is too fine, it retards the setting, and reduces the hardness. Pit sand will make very good work, but to produce a stone so good as that formed on a base of river sand, the proportions of cement and lime will have to be increased. Very fine sands, like those of the Landes, require very careful mixing and a prolonged compression in mould to produce a first-class béton.

The ingredients are measured into a mixing mill in barrows, and during the process small quantities of water are gradually added as the mixing proceeds, until the béton becomes in the necessary condition; the more completely this part of the work is done the more rapid will be the setting, and the harder will the stone become.

The ordinary form of grinding mill employed consists of an iron cistern, the bottom of which is perforated, and in the centre of which revolves a vertical shaft, armed with a number of helical knives, and carrying beneath it a cycloidal arm, which in each revolution discharges a part of the paste. A penstock covering the outlet regulates the discharge of the béton. The material thus obtained from the mill is in a firm but plastic state, and it is thrown into a mould, in thin layers, and each layer, as it is laid in, is beaten and compressed by the regular and even blow of a sixteen-pound hammer. In order to secure a perfect adhesion and union of the different layers of material, especially when fine sand is used, it is generally the custom to cross-cut the surface of the layer in order that the superincumbent thickness may be thoroughly united to it.

There are two kinds of moulding to which the Coignet béton is applied, the first being used when the material is employed *en masse* in place, the second when it is moulded in blocks to be subsequently employed. The moulds which are intended to be used in place

are composed of close boarding kept in place by means of cross-bracing. This mould carries the ornaments which are destined to appear upon the face of the structure after completion. In the second class of work all kinds of ornament can be produced from cornice to statuary.

Of late years the application of the Coignet béton has been equally extensive and varied. In Egypt, where it has been employed on a vast scale, lighthouses have been reared out of the almost impalpable sands of the Isthmus of Suez. In Paris, some forty miles of sewers have been constructed of the same material; and arches of the basement buildings of the Exhibition of 1867, saw mills at Aubervilliers, the numerous cellars of many private houses, entire buildings of five and six stories in height, railway bridges at Sainte Colombe, on the Paris, Lyons, and Mediterranean Line, a church at Vérinet, and above all, the large works connected with the new Paris water supply.

The exact proportion of materials employed on works of different classes, and with sand and lime produced from different districts, will be interesting. Thus the work about the Exhibition of 1867 was formed of a mixture by bulk of 5 of sand and 1 of lime, and $\frac{1}{4}$ of cement. The same proportion holds good for the sewers, and the rapidity of setting is as great, that the centering can be struck within ten hours after the béton is got in place, and the sewers can be put into service in four or five days after their completion. Arches, of which the rise is one-tenth of the span are generally made with a mixture of 5 of sand, to 1 of lime, and $\frac{1}{2}$ of cement in bulk.

The church at Vérinet is one of the most interesting of the monolithic structure, and was constructed of sand from pits at Vérinet. The mixture was 5 of sand to 1 of lime and $\frac{1}{4}$ of cement. In the saw mill of Aubervilliers, the arches are 27 feet 10 inches in span, and $13\frac{3}{4}$

feet thick at the crown, the proportions are also 5, and 1, and $\frac{1}{2}$ of cement. One of the most generally useful applications of this material is in the construction of the basements of houses. In the ordinary form of construction of stone piers, supporting rubble masonry arches are employed, involving numerous joints, and causing an absence of perfect uniformity. From this cause numerous settlements ensue, which are avoided by the use of the homogeneous béton; for the whole substructure can be made in one single block, over which the superincumbent load is equally distributed, and a uniform pressure upon the foundation is obtained. One house, in the Rue de Miromesnil is constructed entirely of béton, and it contains two staircases, the one formed in the usual way, with a number of moulded blocks, the other a spiral staircase, from basement to garret—a monolith.

The distance of Paris from the source of the Vanné is more than ninety-four miles, and in its course to the city the line has to traverse a series of valleys and ravines, to cross rivers, roads and railways, and the numerous requirements of the works have involved the formation of extensive bridges, aqueducts, syphons, and tunnels. An immense reservoir will be completed almost close to the park of Montsouris, and a long aqueduct upon arches will be made almost close to the old Roman aqueduct of Arcueil. But the heaviest works upon the undertaking are those crossing the valley of Fontainebleau for a distance of more than twenty-five miles between the river Loing and the river Essones. This length, almost entirely without building materials, would have involved very costly works if masonry had been employed, and the Engineer-in-Chief, M. Belgrand, has therefore availed himself of the Coignet process, and utilizing the vast masses of sand that lay ready to his hand, has formed the works of béton. Not only have the aqueducts been constructed of this material, but the tun-

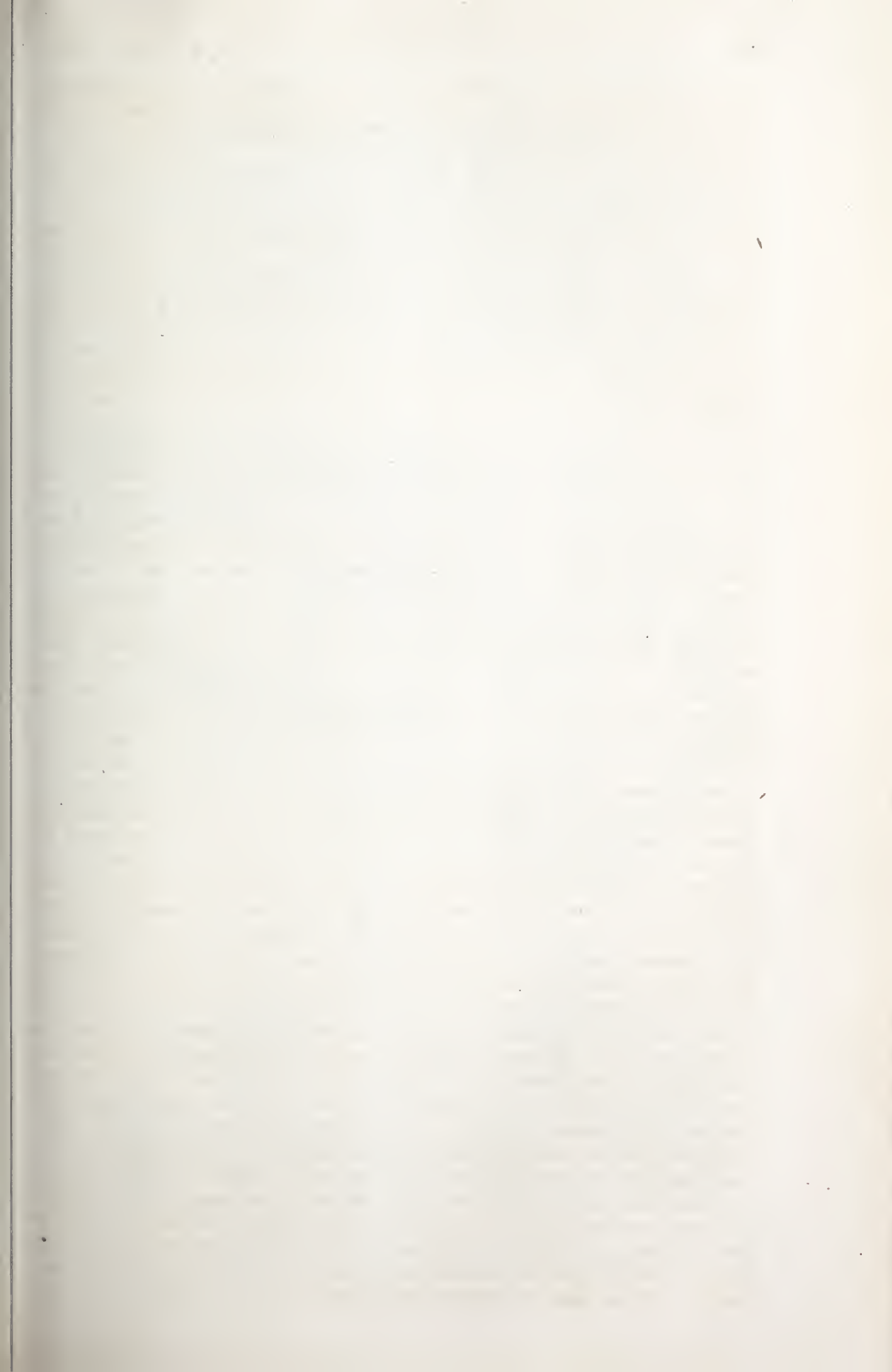
nels also to the extent of several miles, about six feet six inches in diameter, and eight and five-eighth inches thick, and these were all formed with the same success that has attended the application of the system to the sewers of Paris, the centres having been withdrawn almost immediately after the *béton* had been rammed into place. The aqueducts crossing the valley are supported upon arches, extremely light, and rising to a maximum height of fifty feet from the ground. The openings are about forty-two feet six inches, and the thickness at the crown fifteen and three-quarter inches. The success which attended the application of this material in the construction of the narrow openings supporting the aqueduct induced the engineer to extend its use to those wider arches spanning rivers, roads, and railways, and, a series of experiments having proved highly successful, monolithic structures, of ninety-eight feet six inches and one hundred and fifteen feet nine inches openings, and with one-sixth rise, were rapidly formed. Two of the principal of these works we illustrate, one of which represents the aqueduct across the valley of the Loing, the other the aqueduct of the Grand Matre in the forest of Fontainebleau.

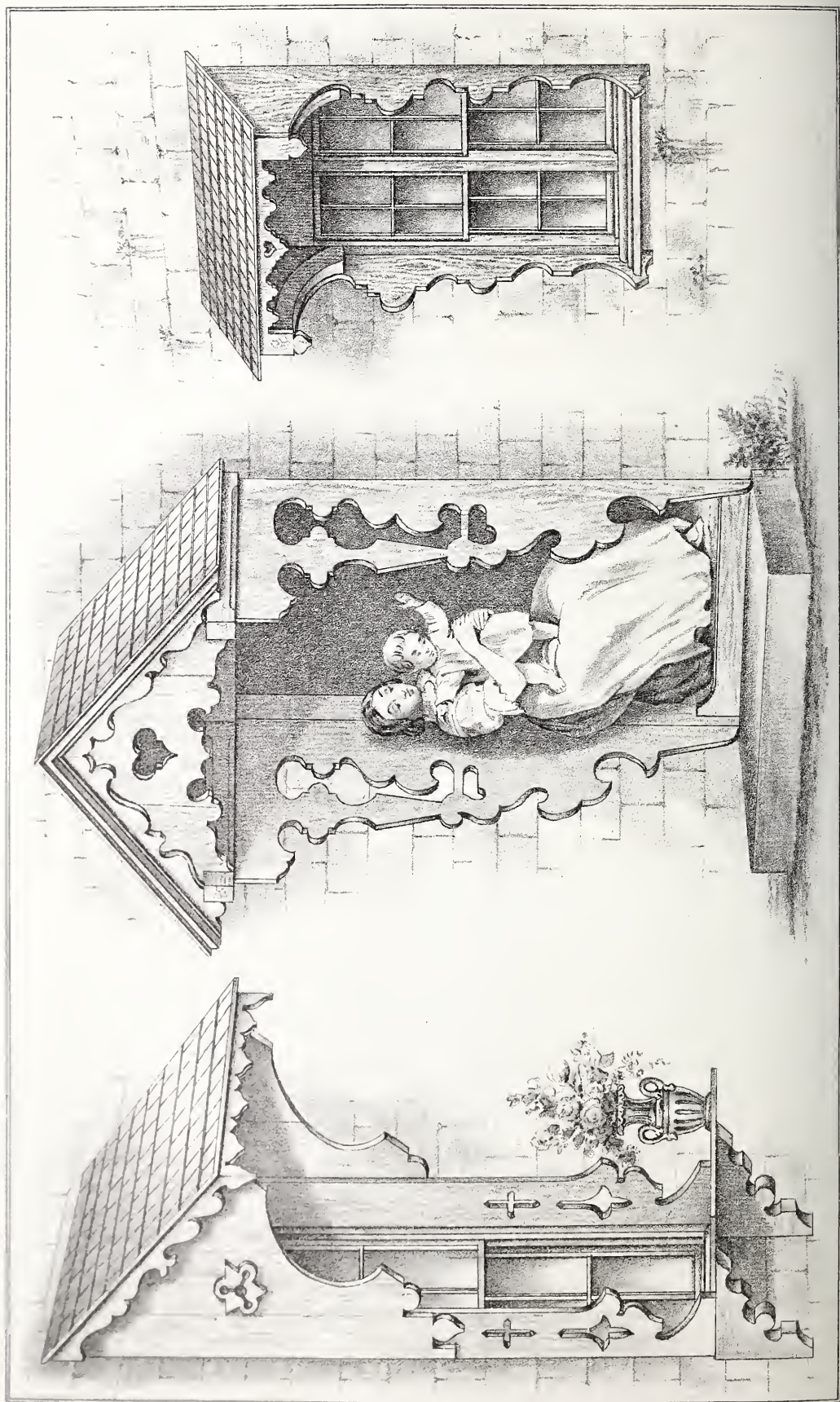
It will thus be seen that while we have refrained from experimenting (with one exception) in this method of construction, French engineers have advanced to recognize its value, and to employ it largely for a variety of work, having tested its reliability by a series of exhaustive trials. The single exception to which we refer is the concrete bridge constructed by Mr. Fowler across the Metropolitan Railway at Kensington, but even that experiment was scarcely analogous, for the material employed was simply concrete, mixed with cement it is true, but mixed in the ordinary way, and thrown into the mould instead of being carefully set in layers, and well combined, as in the Coignet process. But the extensive adoption of

concrete structures in France will probably be followed by an equally extended adoption of the system here.

FAMILY ICE HOUSES.—A plan of constructing a cheap ice house, sufficient for the wants of a large family living in the country, near a pond of fresh water, has recently been suggested. A frame building, twelve feet high, it is asserted, will be sufficiently capacious for all purposes. The house should be supported on posts elevated a few inches above the ground to secure proper drainage, and should be constructed of three-inch joists, with an outer boarding, and having inside another series of uprights, also boarded, from six to ten inches removed from the outer shell. The floor should be made of solid plank, and the space between the two walls should be filled with tan, sawdust, straw, or chaff; when a roof of good pitch is added, the ice house is completed. A drain for water should be made from the floor, and the space above the uprights, between a loose flooring and the pitch of the roof, filled with straw or hay, or some similar dry, porous material. On the roof should be a ventilator, the top defended from the rain or snow.

The ice should be packed in one solid mass, the sides not reaching the walls of the building, but allowing a space of from six to twelve inches all around. The top of the ice should be covered with straw, and the door should be like the sides of the building, or double doors should be made, one in the outer and the other in the inner wall. Morning-glories or any climbing vine should be planted around the building, and should be made to creep up the walls and over the roof, as an additional defence against the burning summer sun. A building of this kind, it is asserted, could be erected in one or two days by two men, even if they were not practical carpenters.





THE SWISS STYLE.

THE vast proportions of our country, and the great variety of climate embraced by it, as well as the alternation of hill and dale, mountain and valley, in all the dread grandeur of the one, or quiet seclusion of the other, give us appropriate locations for all the desired designs of domestic architecture which we can find elsewhere in the world.

This style is one well adapted to the Alleghanies, or Appalachian Mountains, whose extended sides will offer an endless variety of choice sites for this transplantation from the rugged land of the Switzer.

For the South its summery light and airy effect must make it peculiarly desirable, especially where the scenery is Swiss in character.

The Swiss cottages are usually raised upon stone basements, forming a broad plateau or terrace, from which the most enchanting views of mountain and glen are obtained. The superstructure is wholly constructed of wood hewn smooth, and joined closely together; the roof being projected on brackets, which are of themselves quite characteristic of this most romantic style. The external walls are studded, and with roof, are covered with fancifully cut shingles. The outer gallery which surrounds the second story is reached by an outer stairs, all being under protection of the roof. Sometimes, however, the stairs to the second story is on the inside; and this is a much better arrangement, even at a sacrifice of room. The windows extend in horizontal length, along nearly all the breadth of the end walls, and occasionally so in the front walls; they are formed of small, square quarries, or squares of glass set in wood casements.

The peculiar structure of the roof of the Swiss cottage has its origin in ne-

cessity, its native snows being apt to descend from the glaciers in overwhelming avalanches. Although in our country we have nothing of this sort to fear, yet the extraordinary projection of the roof has, nevertheless, great advantages in our southern clime, where the rays of a too liberal sun are to be guarded against.

In the design now under consideration we have all the effects of ornamentation characteristic of the style, and in the plan will be found every attention paid to comfort and convenience as understood in our country. In fact the effort is properly a complete adoption of the Swiss style to our wants and requirements.

In the finish of the exterior, if the wood used be of a good appearance, free from knots, shakes, or other very apparent blemishes, oiling the surface is preferable to painting. But, as lightness, and brightness of effect are very desirable, to counteract the sombreness otherwise produced by the overshadowing roof, dark staining or coloring should be especially avoided. And were there no question of economy, we would prefer coating the woodwork with silicate of soda, (soluble glass.)

THE BOSTON COLISEUM LOTTERY.—S. L. Maguire, builder and lumber dealer, who drew the Coliseum, is one of a party who entered into an arrangement with the Association, whereby they agreed to buy all the tickets remaining unsold on the morning of the drawing, at a certain price, said to be about eighteen cents each. It is said that a large number of tickets came into possession of Mr. Maguire in this way, and that he was the most extensive holder of tickets.

THE SWISS LOG-CABIN.

THE second illustration here presented is of a far humbler class, yet not less useful in its way. It is a sample of those log buildings to be met with in the Canton of Berne, in Switzerland, and although it differs somewhat in execution from those log-cabins of our own country, it presents, nevertheless, some points which might be made available in such construction. Many gentlemen desirous of introducing this most rustic and very picturesque style for gate lodges, gardener's house, etc., will see that, with a little care in the construction, a very desirable effect may be produced, and that with a liberal use of the saw instead of the axe, our log buildings may be made to present a much more acceptable appearance than they present throughout the country at this day.

The structure here shown is a barn, stable, and cow-house, combined. It is comfortable, and very permanent. It will be observed that the logs lie close on each other, instead of leaving openings to be filled in with mud, as is the custom here. These logs are pinned down to each other with stout oak pins at regular intervals along their length, breaking joint alternately, as the layers are placed one upon another. Instead of our *shingling*, the Swiss log-builders lay the roof with boards from pole-plate to eaves, crossing them with lengths of scantling, upon which are laid rocks to secure these in their places. When the rocks are covered with moss the effect is very pretty. And indeed the rustic Swiss throughout presents points of attraction of peculiar grace.

A stone base is a great addition, as well as preservative, to this style, and if at all possible, should never be omitted.

In the event of the dwelling or villa being Swiss, the unity of style should be kept up throughout, in all the out-

offices and dependencies on the entire estate, and even the gates and boundary fences should partake of it.

We likewise present, for the information of those desirous of building in this manner, some details of Swiss windows and a door, with the hoods and cantilever bracket supporters, cut out and carved according to that mode of construction.

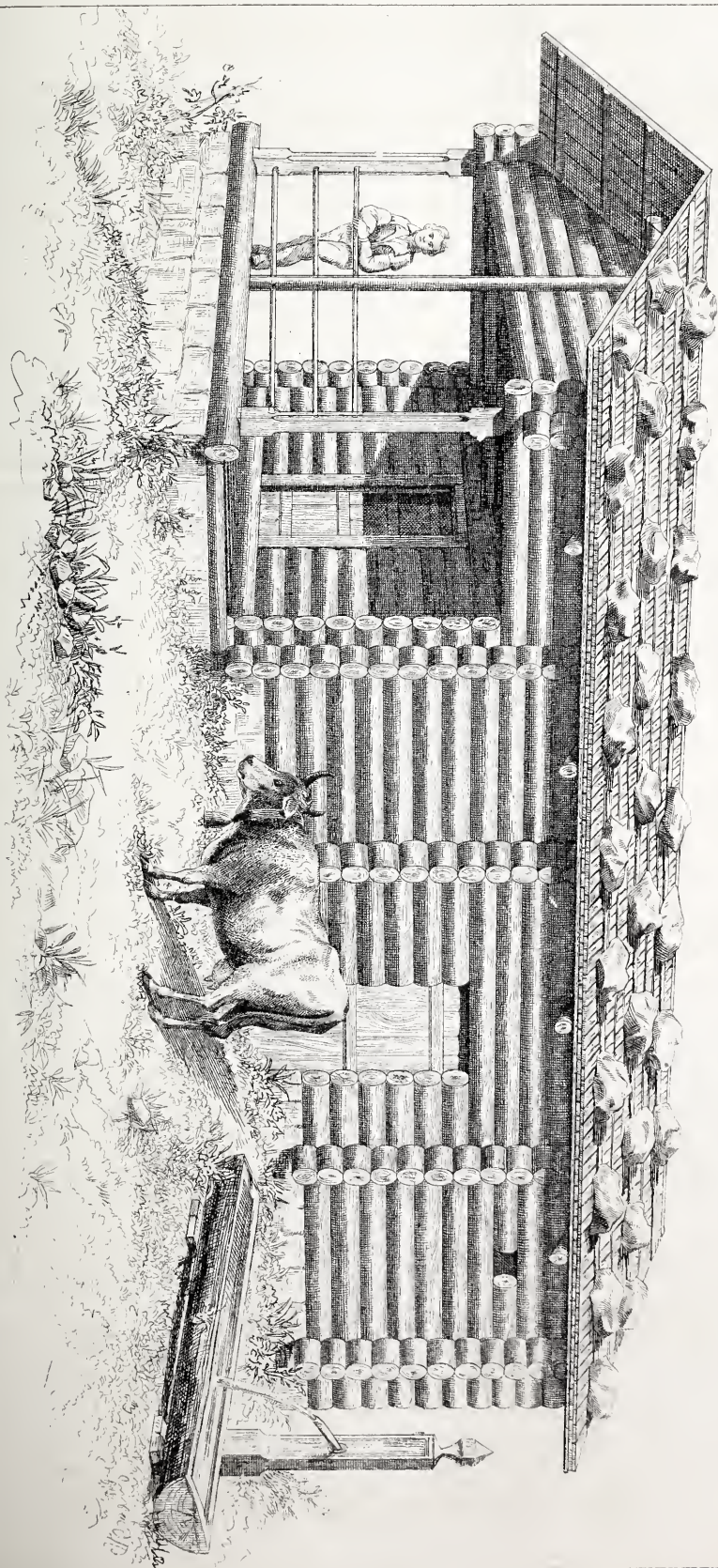
THE YOUNG MEN'S CHRISTIAN ASSOCIATION OF NEW YORK.

THE new edifice is one hundred and seventy-five feet, by eighty-six feet nine inches. There is a hall with four aisles, affording easy egress and ingress, and the seats are admirably arranged. The hall continues through two stories, and has galleries on each side and across one end. The galleries are supported by decorated columns. From the caps spring arches at right angles to each other. These serve to carry the ceiling and floors of the upper stories. By this device the ceiling is divided into panels which give an opportunity for decoration.

The building contains a reception room, which opens into a still more spacious reading room, and both these are connected with a suite of parlors, committee rooms, etc. A stairway leads down from the reception room to the gymnasium, connected with the bowling alley, etc. On the third floor is a fireproof library. There are also several smaller apartments, a lecture room, and class room.

At the left of the platform in the large hall is the organ, which is said to possess more mechanical appliances than any organ in the world.

The total cost of this palatial building, with the ground, is \$487,000. The entire amount has been raised.



Swiss Log Cabin.

OUR BRIDGES.

IT is understood that we are to have another bridge over the Schuylkill, at South street. This will be a great convenience to the residents of that elegant quarter of Philadelphia, lying on the lower side of West Philadelphia. The city corporation should require from our bridge Architects, a more safe and comfortable means of transit, than has been provided by the three other bridges above. These remarks are intended to apply, rather to the plan of the passage-ways over the bridges, with their deficiencies, than to their style of Architecture and construction.

The public, to be sure, take it for granted that the strength and durability of our bridges is what is required for the use to which they are applied. In that respect, then, when cautiously used, they are regarded as safe.

But the late trial of the youthful murderer, Smith, has shown in what other respects the Chestnut street bridge, if not the other two, is unsafe. This bridge occupies a position, which is the very centre of the wealth and fashion of this great and populous city; and there, on it, in an early hour of the night, a man was murdered by this young ruffian, at a time when no policeman was near; and the body of the murdered man remained, lying on the pavement of the bridge, for more than an hour before it was removed. How easy it would have been for the villain to have tumbled the body over the low railing into the river.

As a further illustration of the dangers attendant upon a walk over that or the upper bridge, let any one survey the scene on these bridges, on cattle days, and witness men, women and children huddled under the low railings, or running hither and thither, to escape from the horns and hoofs of the poor beesves, worried to fury by the brutal treatment

of their drivers; at any moment might these infuriated animals gore to death, or toss into the river, any of the intermingled crowd of frightened humanity; there, helpless, and without power either for defence or escape. Great droves of mules, horses, and swine, which know no distinction between foot-ways and carriage-ways, frequently are seen on the Chestnut street bridge, in full position of this most fashionable thoroughfare.

As regards the comfort of the transit, is there any spot between here and Canada, where a person would be exposed to greater sufferings, than on these bridges, during the prevalence of the hurling blasts of our winters? Would it be humane, at such times, to expect a policeman to guard the traveller from the assaults of the thieves and murderers who make the Chestnut street bridge their rendezvous? Is there a locality in the city better adapted than the Chestnut street bridge for their bloody work?

No policeman is so destitute of the physical attributes of humanity, as to maintain his post on this bridge and attend to his duties, for all his energies must be devoted to his own preservation; otherwise the blood would congeal in his veins during the prevalence of the Arctic blasts, which howl so furiously over the Schuylkill.

We are about to have a new bridge, and let us, in it, have provision for the safety and comfort of those whose business or whose pleasure draws them on to it. Let it be constructed with high and strong railings, so that neither murderers, nor horned cattle, can toss their victims over into the flood beneath; let us have deep and wide covered recesses, at convenient intervals, along on the side of the bridge, which will afford a safe retreat from mad animals, as well

as shelter from the winter storms. A reliable police force should be constantly on the bridges, and these sheltered recesses would enable them to attend to their duties more bravely, than when prostrated, either by the winter cold, or the summer sun.

Would it not, then, be advisable to construct the new bridge on a plan which will afford a wider track, a high strong railing on the exterior, with recesses so planned as to protect from the storm and the sun, and afford a retreat from rushing herds of animals. These should be furnished with fixed seats of iron or stone.

Some of the old bridges of Paris and London are grand and substantial monuments of bridge Architecture, and would afford good examples to be followed at this day even.

The Pont Neuf, at Paris, over the Seine, was built between the years 1578 and 1604. It is of stone, and is in two parts, divided by the narrow point of the *Ile de la Cité*. These parts are severally six hundred and eighty feet and two hundred and seventy feet in length; the entire length being ten hundred and twenty feet; its breadth is seventy-eight feet. The arches are bold; above them is a large projecting cornice, supported by thickly set consoles, or brackets, sculptured into grotesque heads. On the piers are semi-circular recesses, used as shops.

The Westminster Bridge, over the Thames, has on each side a stone balustrade, six feet nine inches high, with sheltered recesses, furnished with seats. This bridge is of stone, and was completed in 1750. It is built upon fifteen arches, the centre one being seventy-six feet in span, the others gradually decreasing, until they reach the abutments. Its whole length is twelve hundred and twenty-three feet.

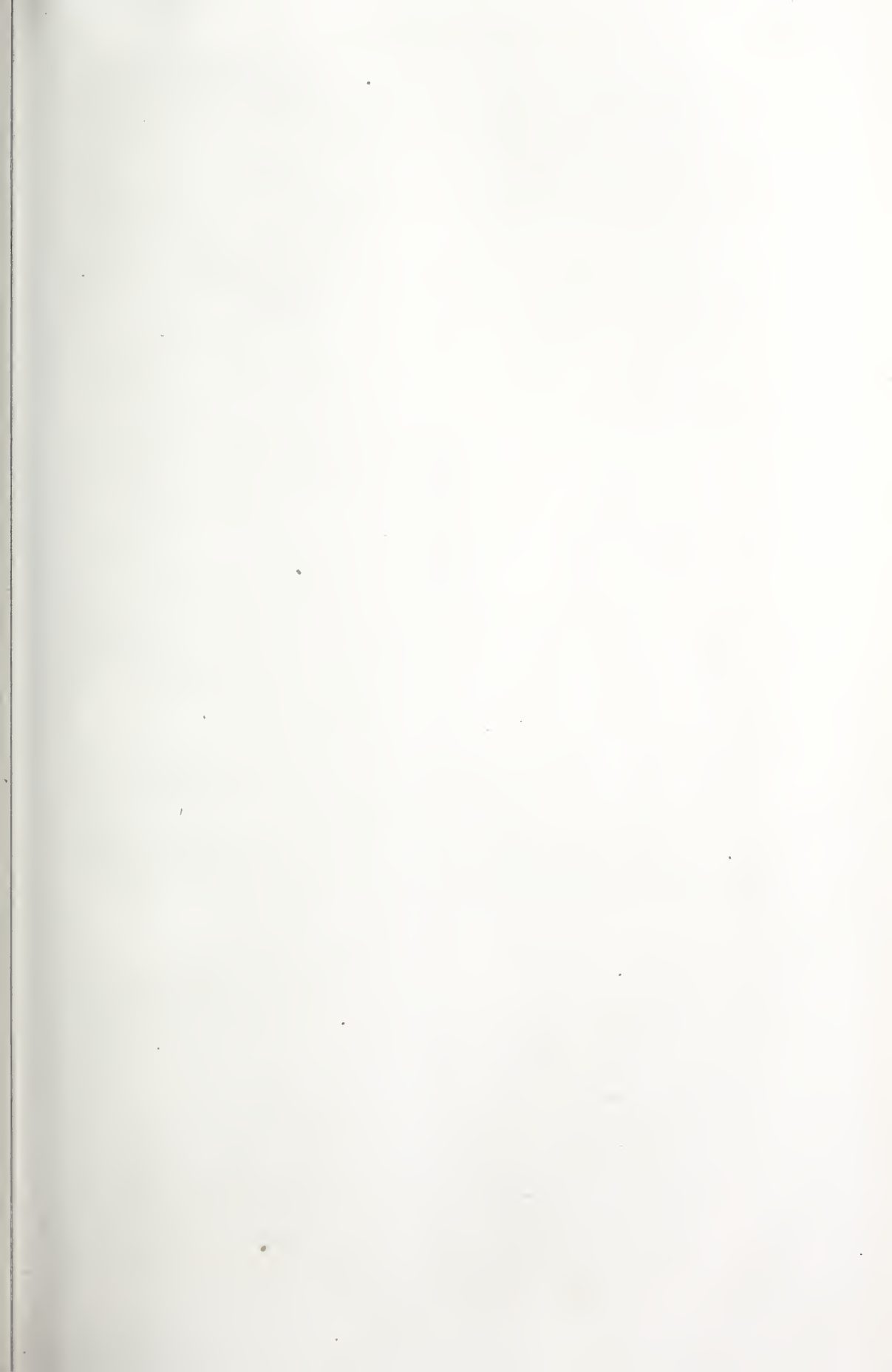
The old London Bridge, which was removed many years ago, in consequence of its piles obstructing the river beneath, has been replaced by the New

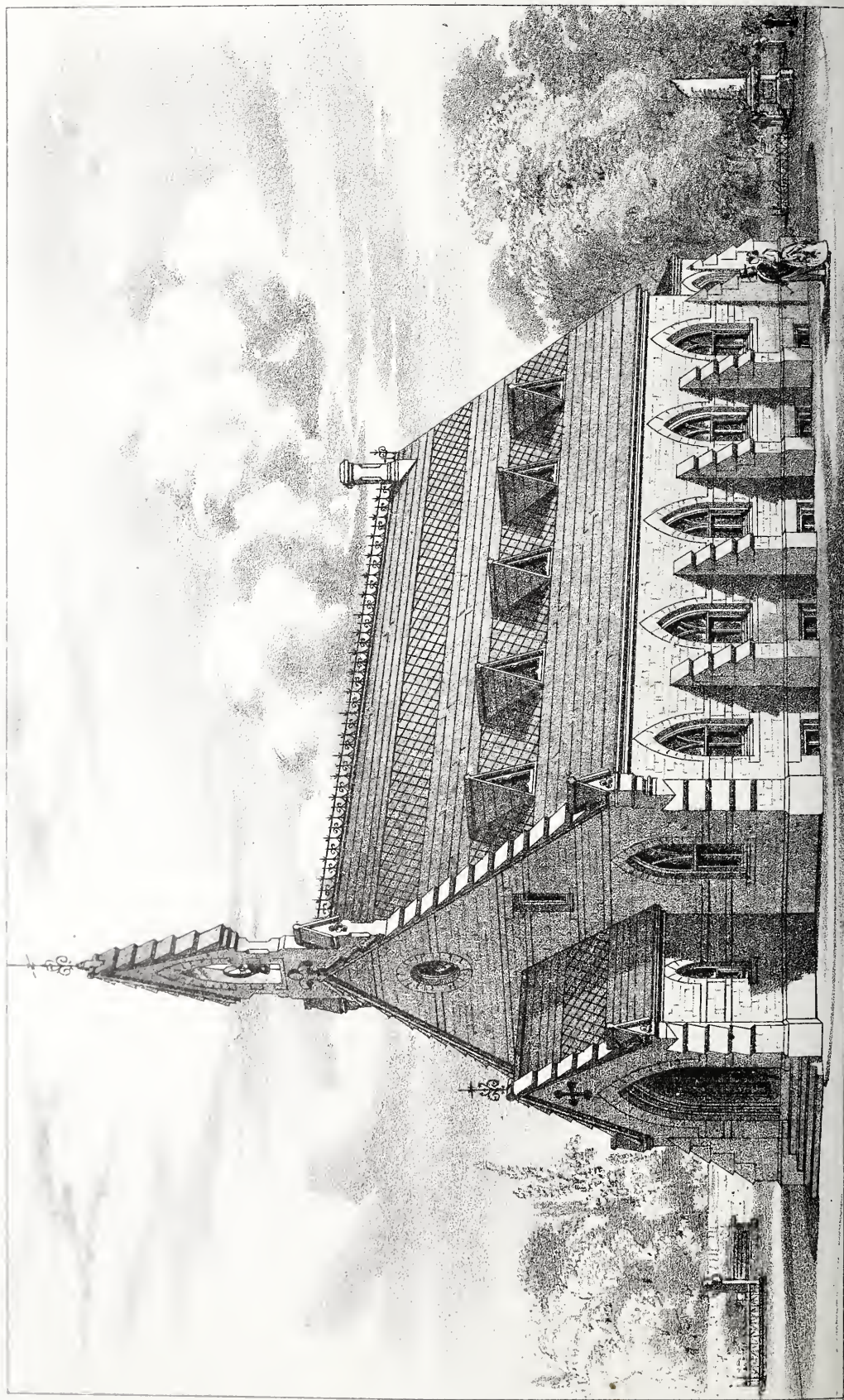
London Bridge, which was opened for travel in 1831. The old London Bridge was finished in 1209. This monument of architectural skill, resisted the hand of time for six hundred years, and was removed by the hand of man, not because of dilapidation, for it was not dilapidated, but because, as remarked above, of its obstruction to the course of the tide. It was built of stone, and consisted of nineteen stone arches, of various sizes, diminishing from the centre to the abutments. The central arch had a span of seventy-two feet. The *carriage* way was thirty-one (31) feet wide, and the footways each seven (7) feet wide. Until 1756, there were houses along the sides of this bridge, connected by arches of timber across the carriage way.

The New London Bridge "is a work of great magnitude and science. It consists of five wide arches, which embrace the whole span of the river." Its entire length is nine hundred and fifty feet, and between the abutments seven hundred and eighty-two feet. The centre arch span is one hundred and fifty feet. The arches next the centre are one hundred and forty feet, and those next the abutments one hundred and thirty feet.

The Waterloo Bridge was finished in 1817. The width of the Thames at this point is thirteen hundred and twenty-six feet at high tide, and is spanned by this bridge on nine elliptical arches of stone. Its entire length is twenty-four hundred and fifty-six feet. The arches are of equal size, being one hundred and twenty feet span, and thirty-five feet high. A French architect describes the Waterloo Bridge as being "a colossal monument worthy of Sesostris and the Cæsars."

Cannot the science of this day give us something equal to those monuments of architectural science built centuries past? The people want substantial architecture, and for river transit, bridges of such a construction that horses





DESIGN FOR A COUNTRY CHURCH.

may with safety, if desired, trot with their loads over them. Let them, too, have safety, such as will be insured them by high and strong railings, as well as substantial piers and arches; not railings of trifling cast-iron work, set on narrow flagstones, which would be tumbled over into the depths below, by a crowd jamming between them. There should be parapet walls, substantially and firmly attached to the masonry of the bridge. Iron railings, or flags similar to those on the abutment arches of the Chestnut Street Bridge, have been known to be blown over by a tornado, and would not resist the pressure of a crowd. The engineering and architectural science of this country might

give us a bridge, built upon piers, upon which outside and alongside of the passage way, there will be space, or width and strength sufficient for the erection of shops; and also for a police station-house. A police station on our bridges has become a necessity, and they are, of all other positions, the most commanding for such a purpose. Rents from the shops would pay the interest on a large portion of their cost. Of the present plan, the bridge is like a great waste commons, unprotected and dangerous. Shops and a police station would be a protection, as well against the attack of villains as of the weather.

VIATOR.

A COUNTRY CHURCH.

THE illustration is that of a simple mode of gothic treatment not uncommonly to be met with. It is at the same time, strong, yet not heavy looking, ornamental, but not expensive. The great pitch of the roof is the leading feature, and the expanse of slating, which would inevitably have given the whole a depressed and gloomy appearance, is broken up by those triangular dormers which add to the lighting of the interior, whilst they thus relieve the exterior from monotony.

The solid robust looking buttresses are evidently well adapted to their work—the enabling of the walls to resist the pressure of such a roof. The only light ornamentation in this design is confined to the apex of the roof where it most appropriately belongs.

The belfry is in perfect keeping with the composition, and gives a characteristic finish to the whole.

The interior should be fitted up with an open ceiling, hammer-beam, or clear French principal, according to taste.

The wood work should be stained dark, and varnished, rather than painted.

The interspace between the principals should be plastered and colored a light blue, and finally the walls might be a warm gray.

The furniture, pews, reading desk, etc., should all be stained a dark color the same as the trimmings, roofing timbers, etc.

In order to present the working requirements of this little Church (so well adapted to numerous small communities) in detail, we will here give all who may feel interested in further information the subjoined specification.

The cellar to extend throughout the length and breadth of the Church, (including the porch and chancel,) and be seven feet deep in the clear. The surface of the ground to be raised two feet above the natural level, and have an outward slope of one inch to the foot.

Masonry.—All the walls to be constructed of stone of a good quality. Those for the cellar to be two feet thick, except for porch and chancel, which are to be twenty inches. The walls of superstructure to be one foot ten inches, and the porch and chancel one foot six inches.

The buttresses must have the same depth of foundation with the main walls. The first course of which must be of through stones thoroughly bedded in cement. The exterior to be faced with square rubble work of ordinary quarry stone.

The dressings of the windows, doors, buttress caps, hoods, sills, string courses, cappings and kneelers, will be regularly tooled brown stone of a light shade. The face of all the front of the building to be pointed off, and the residue be natural face. All to be laid in the best manner and in such tint as may be considered most conducive to a tasteful appearance.

The interior will require furring strips at every three feet built into the wall. They should be four inches wide and one inch thick.

All the inner face of the wall should be dashed with mortar.

The mortar must be composed of good fresh lime and clean sharp sand thoroughly mixed in proportion of three of sand to one of lime.

Flues are not to be less than 8×12, well pargetted on the inside. Those on the front will terminate at the base of the belfry; and those on the rear in the regular way.

Carpentry.—The joists of the flooring will be 3×12 inches, and be placed 16 inches apart, from centre to centre, and laid in two lengths resting on a girder (12×12) in the middle, which latter will be supported on stone piers. Each tier of joists will require one course of bridging through the centre. The joists in the chancel will be 3×10 inches and be raised one riser above the common floor; and three risers at the chancel.

All the joists will be straightened and securely blocked up at the ends.

The Roof will be constructed with four principals, the timbers of which will be 6×10 inches, bolted well at the joints with two tension rods to each of $\frac{3}{4}$ inch iron bridled at the head and stirrups at the foot, with swivels at the

centre. Two collar beams will be bolted on each pair 4×8 inches, with through bolts.

The Ceiling joists will be $2\frac{1}{2}$ ×6 inches, and 16 inches between centres, well secured to the rafters. The jack rafters will be 3×5 inches each, and 18 inches apart from centres, and be well nailed.

The roof to be boarded over close, for slating; and to have five dormers, (as shown on drawing.) It will be finished with an iron crest on the ridge.

The Windows are all gothic headed sash $1\frac{3}{4}$ inches thick, double hung, with weights, cord and pulleys. Frames finished with 2 inch bead on the outside.

Sash in the dormers to be hung with butts at bottom.

Sash of cellar to be also hung with butts to a solid frame built in the wall.

The Front Doors will be double thickness; planed, tongued, grooved and beaded, and hung to a solid scantling with 4×5 inch butts, and secured with an 8 inch upright mortice lock and two iron plate flush bolts into the frame, which will be molded on outside.

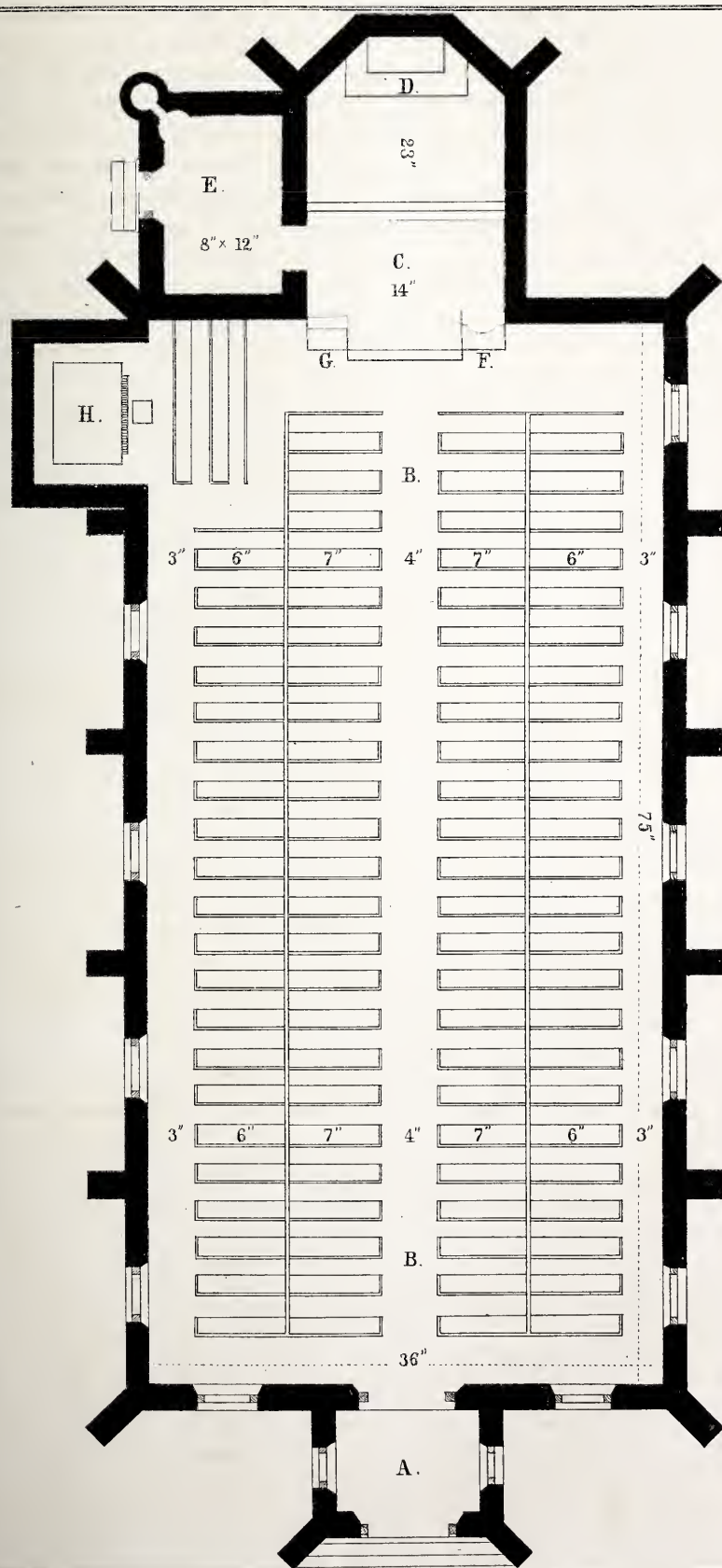
The Floors will be laid with good quality mill-worked boards $1\frac{1}{4}$ inches thick, with the joints struck after being laid. The trimmings will be plain.

The chancel railing, pulpit, reading desk, and communion table to be finished with walnut, and in keeping with the style of the building.

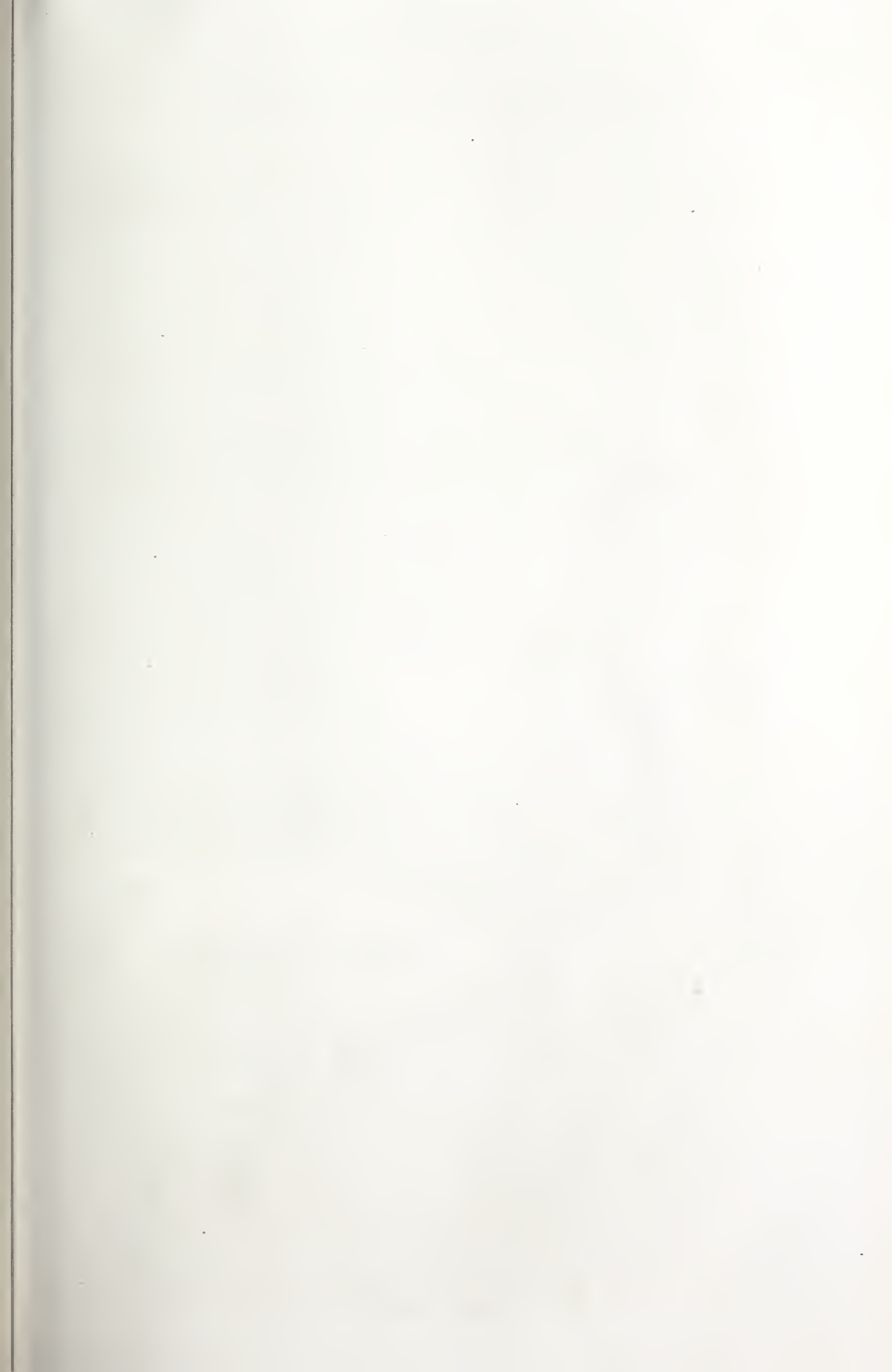
PLAN.

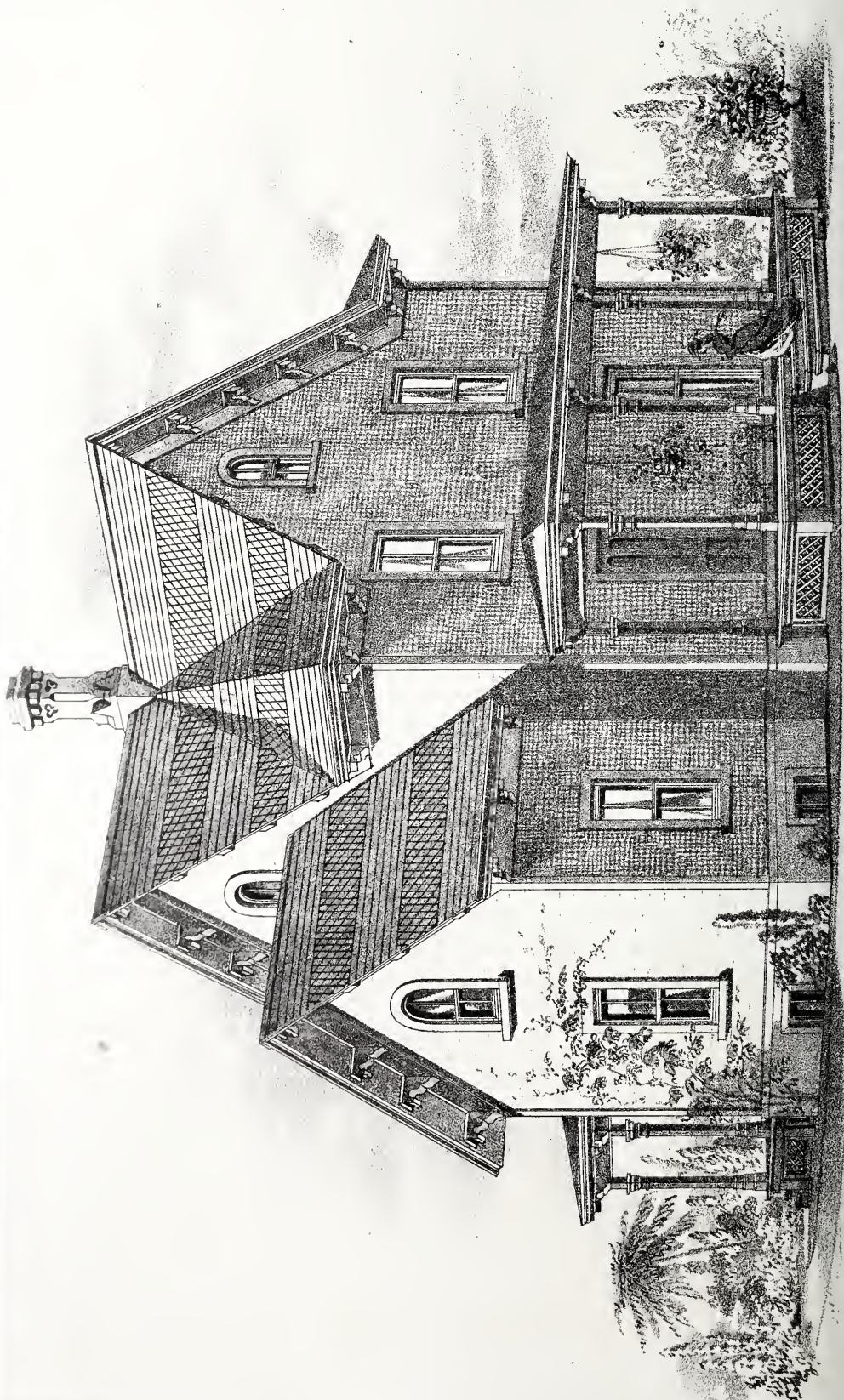
A, the Porch. B, Audience-room. C, Chancel. D, Communion Table. E, Robing-room. F, Pulpit. G, Reading-desk. H, Organ.

SOMEBODY affirms that Isaac Newton's "apple" is only a "picturesque's story," that there never was any apple that had the honor of leading Newton to the discovery of the law of gravitation. What a pity, truly! A remarkable manuscript has come to light, in which the philosopher gives an account of the origin of his great discovery, but never a word about an apple is there in it!



COUNTRY CHURCH.





DESIGN FOR A COUNTRY PARSONAGE.

A COUNTRY PARSONAGE.

THE principal feature of any small village is the Church, with its graceful spire pointing heavenwards; and the Parsonage should be a suitable accompaniment to it. If the one be of a marked appearance, so should the other. The pastor's residence should naturally be as distinct from all other dwellings as the church is different from all other buildings.

The Parsonage is required to be a quiet, comfortable home for the minister, unpretentious and neat in appearance, at the same time that it may have a certain qualifying style about it, making it, as we have said, a feature as well as is the church itself. It is always judicious to have it conform to the style of the latter, at least sufficiently to mark its relationship. Although this, as in the instance here given, is not everywhere practicable.

As, in case the church is gothic, the parsonage might cost more in that style than the humble parishioners could well afford, and therefore a plainer and cheaper style would be advisable.

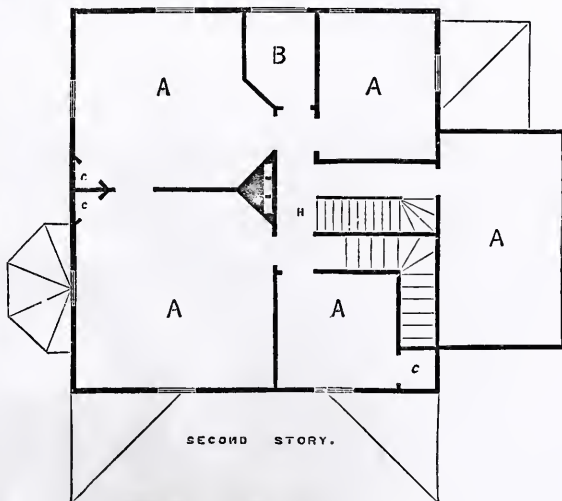
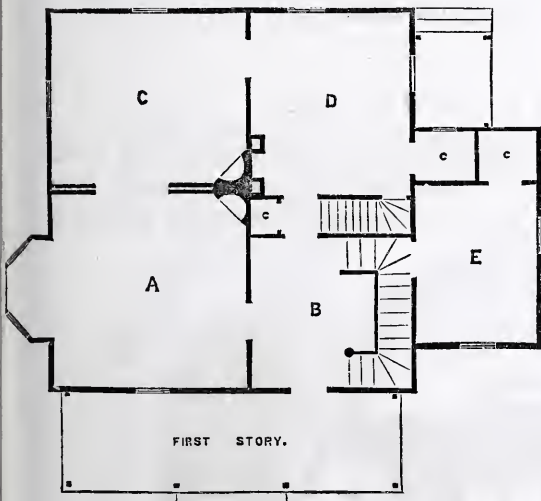
The accompanying design is one which presents a modest, yet marked appearance, and, located in a suitable place, surrounded with all the simple, yet elegant ornamentation of well-cared for shrubs and flowers, cannot fail of its required effect, the indication of the dwelling of the village pastor.

The plan of the principal story is here given:

A, Parlor. B, Hall and Staircase. C, Dining-room. D, Kitchen. E, Office. F, Pantry.

The second story is thus apportioned:

A, A, A, are Chambers, with closets, hall, stair-landing, etc.



SIR SAMUEL BAKER's expedition, consisting of ten steamers and thirty sailing vessels, left Alexandria for the Albert Nyanz. He said in his announcement of plans to the Paris Society of Geography, "After having thoroughly explored this great lake, I will establish commercial stations along its shores at

convenient intervals, so as to form a chain of communications, in a straight line, from Gondokoro. I hope that the expedition will not only serve the interests and develop the resources of the region of the Nile basin, but will open up a highway to civilization to the very heart of Africa.

BOIS DE BOULOGNE.

ELEVATION OF THE TOWER OF LONGCHAMPS.

THIS structure, which is a restoration, or more properly a new treatment of an old idea, is in itself respectable from years. It was originally, as it now is, a *columbiere*, or pigeon house, the plan being that of a small tower within a larger. The small or centre tower was a winding staircase which gave easy access to the numerous pigeon's nests in the main tower.

The old structure fell into such a state of decay that it became necessary to rebuild it, and it was accordingly succeeded by the present structure, as seen in the engraving, which is in the form of a military tower, with its open *crenelles*, ornamented with fancy iron-work. This embattled parapet projects boldly on consoles, and gives to the tower, which is fifty metres in height, an expression which is very pleasing.

This *columbiere* is an object which might be very well introduced into our American parks, as serving the purpose also of an observatory, or lookout, from whence, as from this at Longchamps, the surrounding prospect might be fully enjoyed. There are numerous polygonal shapes, and many styles, which might be given to it, so as to conform to the requirements of the locality, and it is possible that an improvement in this might be made on the design of the *Tour de Longchamps*. But there was already an old time tower, whose memories had to be, in part at least, retained, and hence, we presume, the reason for this peculiar construction.

The plan speaks for itself. The roof is a platform well calculated to bear the weight of a large assembly of observers of the surrounding landscape and its many beauties.

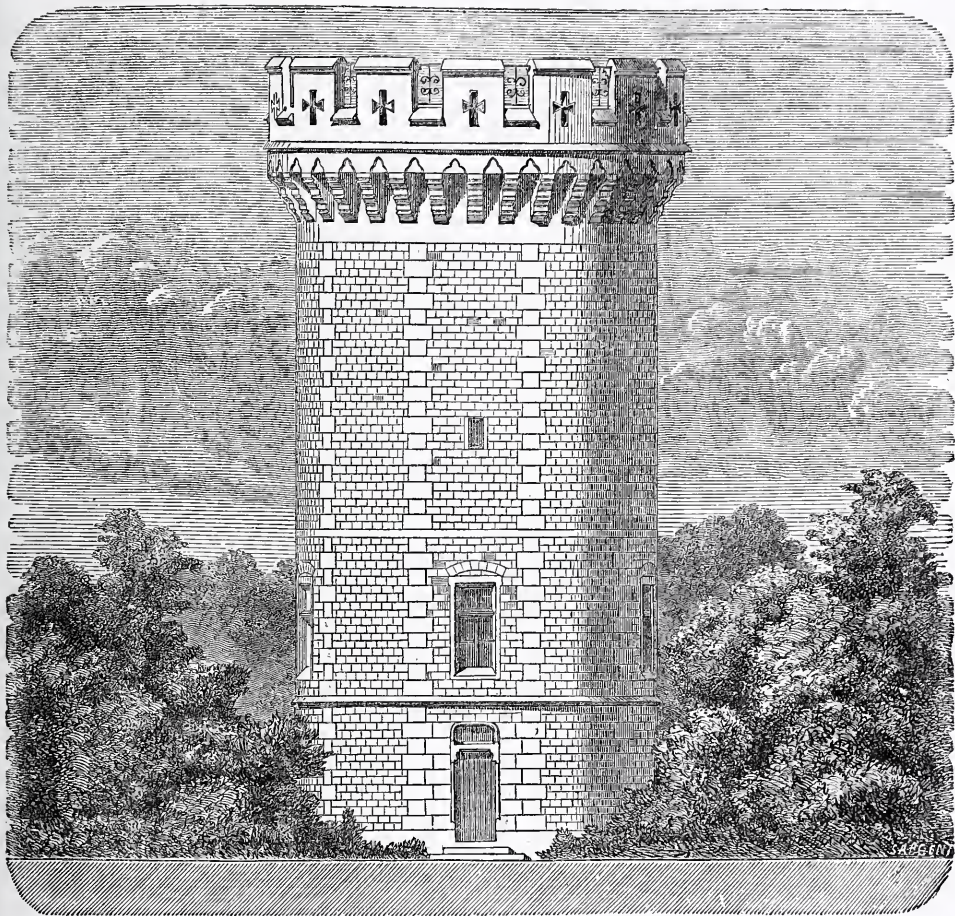
A COUNTRY HOUSE.

THERE are many persons desirous of building new or rebuilding old country residences, to whom the orna-

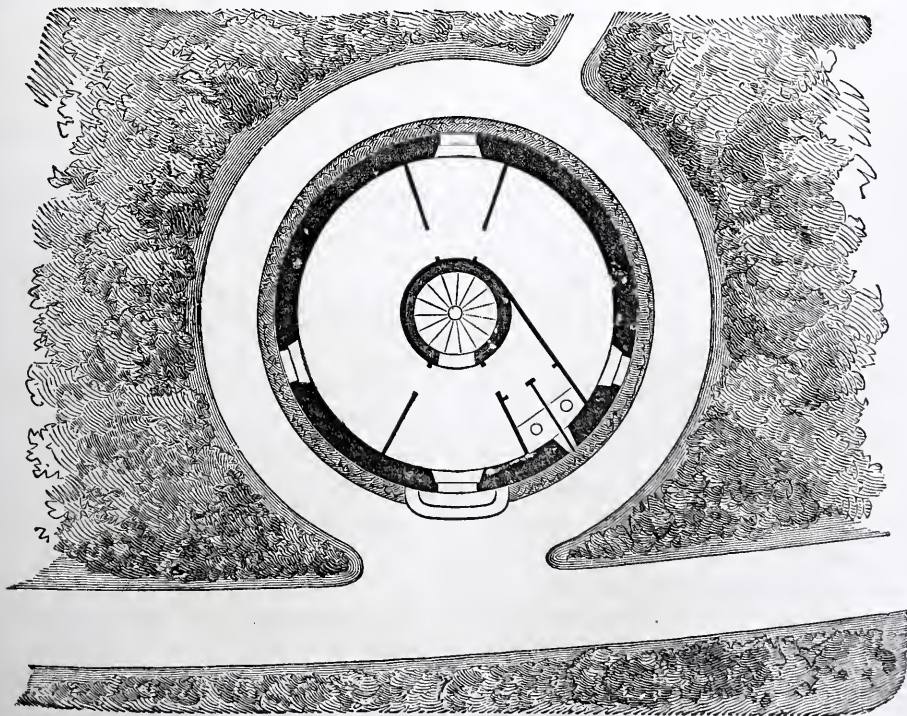
ment with positive comfort is what they seek, and such a taste is here answered. For perfect simplicity of finish, at the same



ment usually applied to rural construction is very distasteful. Plainness | time accompanied with adequate break up of outline, and massing of parts,



"TOWER OF LONGCHAMPS."—ELEVATION.



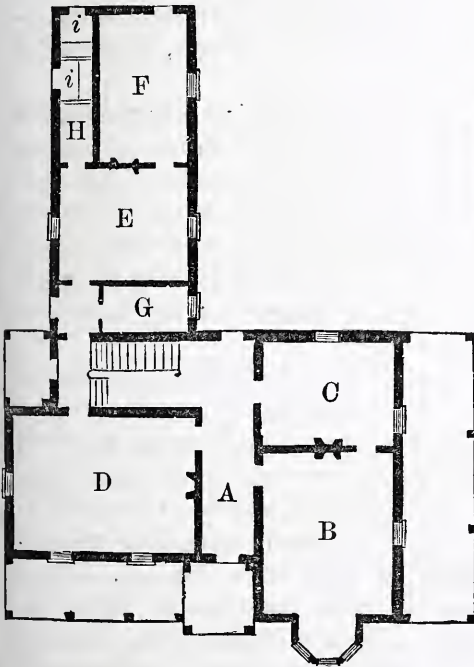
"TOWER OF LONGCHAMPS."—PLAN.

may be here found in sufficiency, allied to fair proportion.

Such a house, constructed in stone, neatly pointed, and having a slate roof, with metal covering to piazza roofs, and all the joinery executed in fair style, of appropriate woods, might be constructed in the vicinity of Philadelphia, for \$7,000, and for more or less than that in other places, according to the market prices of material and labor.

The plans of this country house are all that can conduce to comfort and convenience.

FIRST STORY.

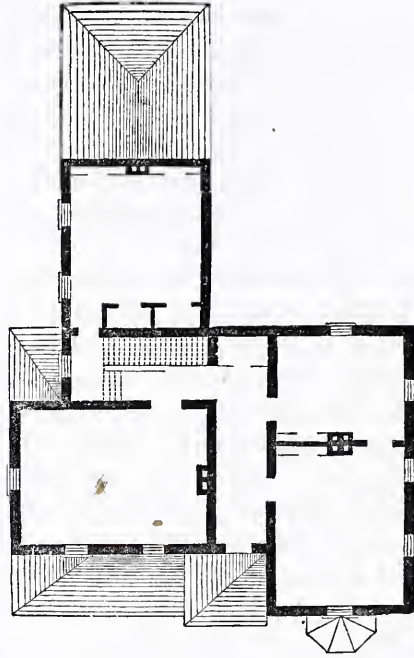


A, Hall, 6 feet wide; Stair Hall, 7 feet. B, Parlor, 14×20, with three light bay windows. C, Library, 14×11, with door into parlor. D, Dining-room, 16×20; entrance remote from hall door. E, Kitchen, 14×15. F, Wash-house, 10×18. G, Pantry, 5×8. H, Store-room, 4×6. i, i. Water-closets.

SECOND STORY.

The three chambers in the main building, correspondent in size with those rooms beneath them on the first story. The bedroom in the rear is 14×17, and

has two closets, besides those at each side of the chimney. The wash-house is roofed in, as may be seen.



The rain water can be conducted to the kitchen and the water-closets with great ease, so as to create a most efficient supply.

IN his report to the Secretary of the Interior, Mr. Edward Clark, architect in charge of the Capitol, will make several important suggestions in regard to improving the grounds surrounding that edifice. The original plan for the improvement of this part contemplates the removal of the street railroad track out of the Capitol grounds to First street east. Objection has been raised by Senators and members of Congress, on the ground that the railroad was a convenience to them in reaching the Capitol. Mr. Clark will propose, therefore, that the space on the eastern front shall be made a parade, with paved foot and carriage-way—the railroad to be diverted from its present course and run under the stairways of each wing and the central stairway.

LESSONS FOR LEARNERS.

THE ORDERS.

NOW, that our student friends have been inducted into the early mysteries of an art that has in all ages shed a lustre on the name of any nation that cultivated an acquaintance with it, the grand era of its culminating glory is reached, and we proceed at once to speak of "the Orders," as they are called.

The word "order," signifying system, has been most properly applied to the regulation of these, the main features of a style; and this methodizing (so to speak) the laws which govern that style by means of these orders are founded on the immutable principles of taste, and cannot be abrogated or repealed, although they may be rendered or treated differently, according to the respective views of those who use them in their architectural compositions.

VITRUVIUS gives it as his opinion that the system of the orders was founded on the primitive structures of man. That is, the columns were made to represent the tree-trunks; the entablature, the cross-beam resting on them; the pediment, the angle formed by the pitch of the roof, and the various minor features, such as triglyphs, and mutules, which represent the ends of the beams and rafters of the roof.

Whether these suppositions be founded on fact or otherwise, matters little to our present purpose, which is to give the learner an insight into the rules which govern the construction of the orders.

Greece justly claims the perfecting, if not the sole invention, of the three principal orders of Architecture, namely, the DORIC, the IONIC, and the CORINTHIAN, which compose the incomparable style of that most tasteful of nations. Roman Architecture is composed of such models, reformed to suit the peculiar tastes and requirements of a nation

not so rigid in its notions as that from which they freely borrowed their first ideas of an art which they afterwards made so much their own.

But, as we have said, the laws which constitute the "Orders" are unchangeable, and therefore it differs little whether the dimensions, or the ornamentation are unlike in the respective styles, the great leading principles are FITNESS, PROPORTION, and TASTE, and as long as these are maintained the fancy is free to treat the orders according to the requirements of the design, whatever it may be.

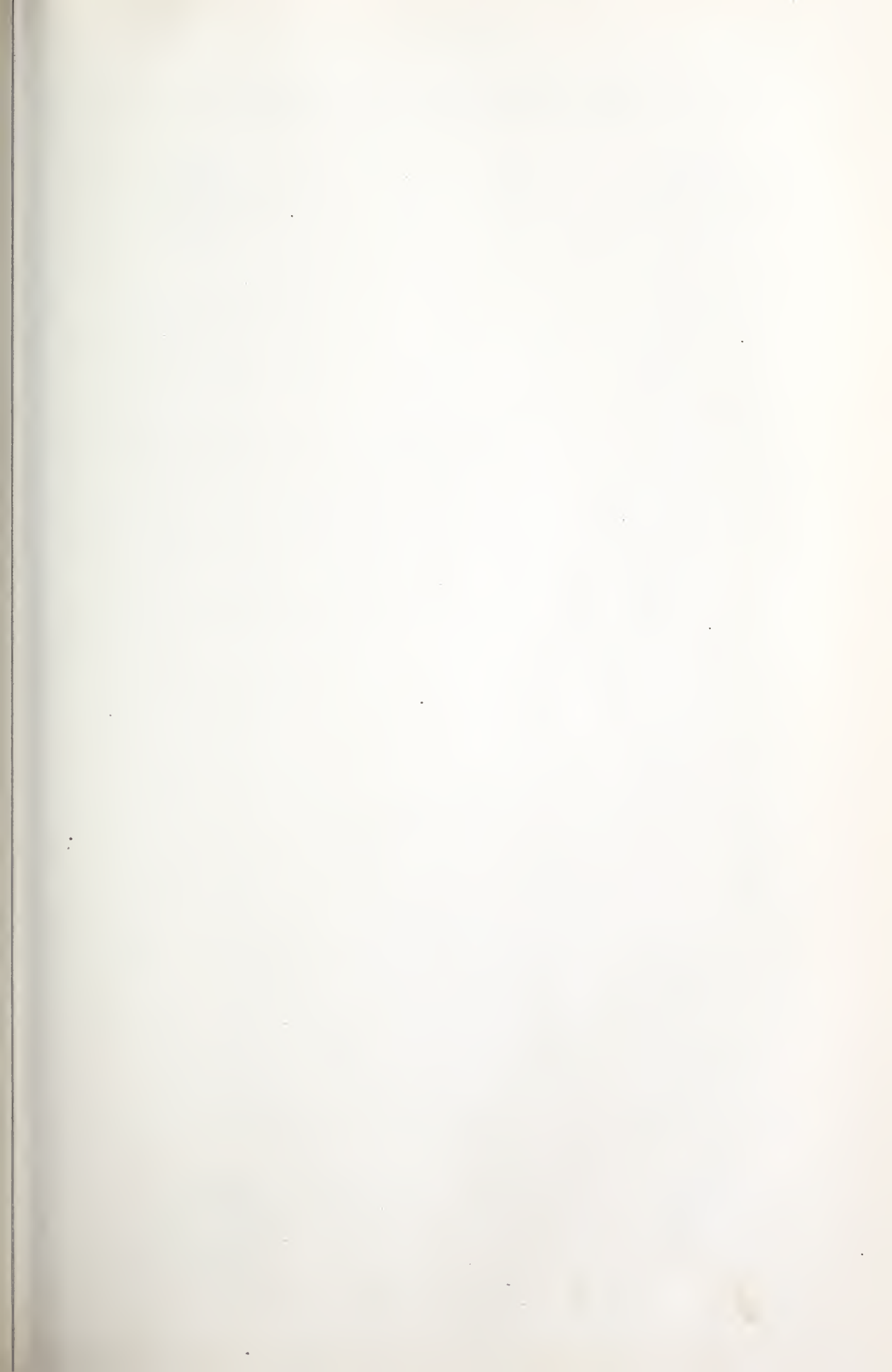
We acknowledge but four orders, the *Tuscan*, and the three orders of Grecian origin, namely, the *Doric*, *Ionic*, and *Corinthian*; as there is no reason for including the "Composite," that being, as its name imports, nothing more nor less than a mixture of the *Ionic* and *Corinthian*.

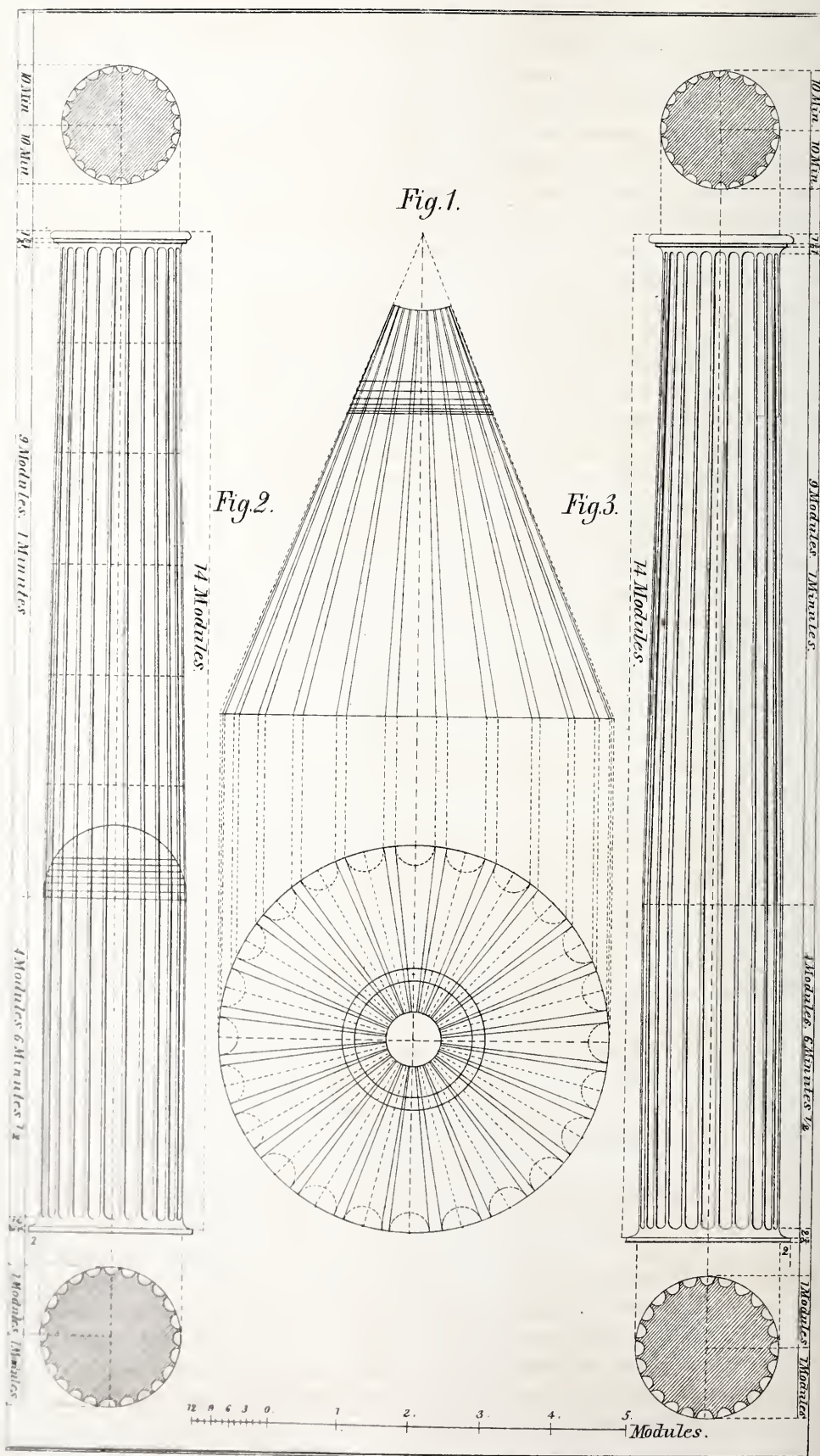
PALLADIO's and VIGNOLA's treatment of the Roman orders is what we have chosen as being in keeping with the popular style of the day, and according to those eminent architects, are the following illustrated RELATIVE PROPORTIONS OF THE FOUR ORDERS. Commencing with the *Tuscan* order, we draw a centre or standard line, on which is marked off the required height of the order, which we divide into 19 equal parts, of which we take 4 for the pedestal, 12 for the column, and 3 for the entablature. The proportion being—the pedestal one-third of the column, and the entablature one-fourth of the same.

The scale by which the orders are constructed is what is termed a *module*, (being half the diameter of the column at the largest extremity of the shaft,) and this module is equally divided into 30 parts called minutes.

Vignola and Palladio, however, differ in this, that the former divides his







Mode of Diminution and fluting.

module or semi-diameter, into 12 for the Tuscan and Doric, whilst the latter divides his into 30 minutes. Palladio's course is that which is most generally adopted. But it is a mere matter of fancy, and differences in it are immaterial.

Vignola's treatment of the Tuscan order being the one we now illustrate, we will divide the module into 12 minutes. It will be seen, then, that the whole order being divided into 19 parts, it makes 22 modules and 2 minutes; which being sub-divided, gives 4 modules 8 minutes to the pedestal, 14 modules to the column, and 3 modules 6 minutes to the entablature. The shaft being 11 modules 8 minutes high, (as figured on the illustration,) is divided into three equal parts, the lowest part being of equal diameter throughout, and from it upward the shaft diminishes from 12 minutes semi-diameter, to $9\frac{1}{2}$ minutes semi-diameter, (or module,) in other words, $2\frac{1}{2}$ minutes.

The sub-divisions of the pedestal, column, and entablature, in their height, are given accurately in the illustration; as are likewise the numerous projections.

The whole order is shown in strong lines as *blocked out*, and the dotted lines show the contour of the finished column.

The simple blocking out of the other three orders is given, more to contrast the distinctive dimensions of each, than to go into their details. It would facilitate the work of the learner very much, to thus block out the grand divisions of an order before proceeding with the mouldings.

A careful study of the plate here given, cannot fail of leading to a knowledge of the Orders.

The second plate exhibits the mode of describing the channels of the fluted columns by scale.

Fig. 1. Taking any diameter, describe a circle with one-half of that diameter as a radius. Divide the circumference so found into 24 equal parts, and take any one of the separating points of these parts as a centre, and three-eighths of

one of the parts as a radius, and describe a semi-circle terminating at the circumference.

Do the same all around, at every one of the 24 points.

Next, draw a horizontal line parallel to the diameter, and from the terminating points of the various semi-circles draw perpendiculars to said horizontal line.

On the same horizontal line erect an equilateral triangle, to the apex of which draw all the lines from their points of meeting at the horizontal line. In order to prevent the confusion which would arise from the union of all these lines at one point, it is always advisable to describe an arc at a convenient distance from the apex of the equilateral triangle, (as shown in illustration.)

The scale is now complete, and the learner has but to apply, with his dividers, the diameters (Figs. 2 and 3, lower and upper) to this scale, (horizontally,) and he has the required points, which taken off on a slip of paper and applied to his column, at once give him the means of drawing his fluting with correctness and ease.

Or, he can describe two inner circles, of the actual diameter of the upper and lower points of the shaft within the scale-circle just laid down, and checking these off on the equilateral triangle, he at once has the perfect position of every flute and fillet required.

The fillet, which is a space between the flutes, is from a third to a fifth of the breadth of the flutes.

The Doric Order, however, has no fillets, the flutes coming together without any intervention.

The number of flutes in the Doric order is 20, and in all the other orders 24.

Flutes have sometimes *reeds* or *cables* in them, (in all but the Doric,) and these fillings never extend upwards more than one-third of the height of the shaft.

It will be observed that the flutes always terminate, above and below, in a semi-circle.

THE RISING GENERATION.

BY F. H. WILLIAMS.

WE live in an eminently practical age, one which delights in the loom, the forge, and the whistle of the locomotive; one which sneers at the empty pomp of courts, the visionary speculations of romancists, and the golden dreams of poets. It is, moreover, an eminently progressive age, one which approves of taking time by the forelock and discounting the future, one in which the members of the Rising Generation evince a decided disposition to begin where their fathers left off, without waiting to go through the unnecessary and tedious formalities of adolescent experiences.

Your true American boy considers that he loses a part of his nationality unless he is through with the measles, mumps and whooping-cough at two years, into pants at three, and a confirmed smoker at six. He comes into the world with the true nasal twang of Yankeedom on his lips, conquering and to conquer, harboring a determination to make the best possible use of the unfamiliar objects and circumstances with which he is surrounded.

Existence having been thrust upon him in the most unexpected manner, and without any previous consultation with him as to his preferences in the matter, he naturally, so soon as he becomes aware that he is in the world, reflects upon his novel situation, and *nationally* turns over in his mind projects for the utilization of his surroundings.

Who knows what mighty thoughts may be passing in the mind of your new born American baby. When his cheeks are dimpled with a smile, the fond mother suggests that he is talking with the angels, but more probably he is struck with a lucid idea concerning an improvement in cribs, by which the sides, back and front shall disappear into the

legs, whenever the article is not in use; or perhaps his brain is intoxicated with the fortune to be realized—"sure pop"—from a "patent double-acting, extra-suction breast pump, simple, durable and not likely to get out of order, and which can be retailed for the small price of twenty-five cents including box," the construction of which is all mapped out in his mind, and the satisfaction concerning which is manifesting itself in the smiles upon his lips.

Occasionally he cries, for some day he may require strength of lung should the exigencies of a political campaign demand his services as a stump orator. Moreover he wants everybody to know that he is about, for your Americans are an advertising people; no hiding your light under a bushel nor your goods in a dark store, for them. The American as a baby wants people to know that there is such a baby in his particular locality; as a man he wants to be known in the community; as a politician he wants to be heard from the stump; as a tradesman he wants the public to know the number of his shop and the extent of his stock in trade, and to believe implicitly in the cheapness of his goods and desirability of his "inducements." Therefore in making himself heard in infancy he but found a policy to which he intends to be consistent in later life.

The American baby regards sleepiness as a crime,—particularly between one and four A. M.,—looks upon colic after six weeks of age, as anti-republican and as tending to establish a dangerous precedent, and is altogether a head and shoulders in advance of the infant representatives of other nationalities.

Following his growth we find equally strong national characteristics developing themselves with his strength and



CROSSLEY & WEST, PHILA.



stature. He is energetic, tenacious and wonderfully independent. Let us look at the youth of the poorest classes in this country,—the newspaper boys, bootblacks and those who appear so miraculously from under the very wheels of your carriage, whenever you stop, with an eager and business-like “Hold yer hoss, sir?” Are they not a study in æsthetics? Look at them morally, mentally,—as unique bits of character! They stand alone. Listen to their conversation for ten consecutive minutes; philosopher though you be, you are bound to learn something you didn’t know before, and will come away a wiser man. Their descriptions are crisp and racy, their questions pertinent, their repartees witty and cutting. You may hear many a polished member of society laboring under the forced effort to sparkle in conversation, with less success than is unknowingly achieved by these packages of nature unadorned.

Here you have a knot of them,—incipient citizens, native and adopted, ready for anything, fine points of international law, questions of jurisdiction, political privileges, dramatic criticism; it matters not; all is fish that comes to *their* nets. They are ready to take sides upon any question, from one of parliamentary rules down to who shall have the first pull at a segar stump. Terrible partisans, these chaps!

Each feels his dignity; he breathes his native (or naturalized) air, and stands upon his native (or naturalized) bricks. Each represents simply *himself*; he is not pestered with a troublesome constituency. The group, as it stands, represents Rag and Tag, with a deputation from Bobtail, and is essentially democratic in the truest sense of that word. The language of the group is certainly not calculated to *conceal* thought; it is free from ministerial quibbles and diplomatic subterfuges; it is free from double entendres; it is the renacular. There is no going in and out through a wilderness of unnecessary verbiage, before

reaching the desired affirmation; if one thinks the other is not speaking the truth, he makes him aware of his suspicions by the enunciation of two forcible monosyllables, the latter of which has a harsh and grating sound to ears polite. The assertion by the first that the apparent incongruity existing between the utterances of the second and the facts of the case, compelled him,—the first,—to conclude that he,—the second,—was the victim of misinformation,—which would be the diplomatic way of saying the thing,—would fail to be appreciated by the person addressed either as an affront or a compliment.

Think, my dear reader, what an immense amount of time, labor, patience and stationery could be saved annually, if we were all in the habit of expressing our sentiments, whatever their nature, after the explicit manner of this class of the Rising Generation. Quarrels might arise, but misconceptions never.

Again, if only we all had the ability of adapting ourselves to the circumstances surrounding our individual positions, after the praiseworthy mode of these germs of humanity, how much more contented a people we should be.

Look at this group as it stands; regard it as a whole; then view its parts individually. It furnishes food for reflection, and, if we eliminate slightly, material for moral improvement.

Here is a youthful descendent of Ham,—formerly known as a “nigger boy,” now a presumptive American citizen of African descent, being pretty sure of casting his vote for the man of his choice by the time he is old enough to handle a ballot, and to use vulgarism,—“feeling his oats” already. He is sensible of the dignity of his position, is posted on the general drift of current events, and possesses withal a fair notion of the scope and tendency of the Fifteenth Amendment. He is not easily humbugged, can smoke and swagger with the rest, and believes in “free culled skools in de Soufe.” Just at

present he is in jolly spirits and is indulging in an original Ethiopian acrobatic performance, whose conception as well as its execution, is entirely his own.

Next to him we have a study; a type of a numerous and distinctive class; an embodiment of *Sartor Resartus*. By birth American, by descent Irish, he couples some of the "push" of the former with the native mother wit of the latter. He knows how to sell his papers by activity while their contents are yet fresh; and also how to dispose of his remaining stock "after hours" by plaintive appeals to "help a feller out" or gratuitous information to the effect that his father's dead, and his mother's sick, and that the family exchequer is not in a condition to meet the next month's demand from the landlord, together with careful details of the physical condition of various members of the household,—all which, though somewhat stereotyped, is regarded as only in the way of business and therefore perfectly legitimate.

Oh! ye imaginary dead fathers and visionary sick mothers, what an enormous charnel-house and hospital this world would be, if ye were all actual facts, and not the poetic creations of enterprising minds!

If ye *were* the former, the thesis that the dead buried in the earth are sufficient to form a mass *as great as* the earth, would be demonstrated beyond the possibility of a doubt!

Our young friend does not generally resort to this attempt to succeed by exciting pity however, until other means have failed, but when his other resources are exhausted, he feels himself at liberty to do so, on the principle that self-preservation is the first law of nature, and we cannot consistently blame him.

As he leans over to light his cigar,—a soft, spongy and parti-colored weed, price one cent,—we obtain a first rate view of his contour, which in its present guise is decidedly comical. His hair, cognizant of the fact that it lives in the

air of a free Republic, is thoroughly determined to show forth its independence in the unfettered attitudes in which we see it, and "each particular hair" seems intent upon verifying the prophecy of Hamlet's father's ghost.

His cap, being worn rather as a necessary adjunct of modern costume than with any view to adornment or utility, hangs listlessly from his crown, while his coat (which was originally owned by Augustus Adolphus Fitz-Dasher, who gave it to his serving-man John, who wore it a year and gave it to a poor relation, who pawned it for rum at a shop at which our hero's father purchased it for \$3.75 and after wearing for six months presented it to our hero,) is manifestly intent upon amputating his ears with its collar, while its tails trail gracefully upon the ground, a sad commentary on the mutability of human affairs, and the low position to which a fashionable evening coat may come.

The figure of the wearer would lose a certain amount of individuality without this coat, for it is the invariable accompaniment of that class of youngster's of which he is the type.

The next person in the group, being a more youthful specimen, cannot be said to possess as great a development of genius as his coated *confrere*; in fact he regards the latter as a being naturally his superior, and is disposed to take for granted all assertions made by him, whether respecting the result of elections as yet undecided, or descriptive of feats of personal valor performed by said coated youth on occasions memorable for their peril to himself.

Indeed the younger one has had ocular demonstration of this valor, for when he, the younger, got into a fight with Tim Scrubbs, (*ætat* nine,) son of old Scrubbs, the butcher, because he cheated at marbles and *positively refused* to put up four "commons" against a "chinese" as previously agreed, did not the coated youth take part with the younger, and declaring that fair play should be done,

confiscate the stock in trade of Scrubbs to his own use? And when Scrubbs, —bursting with rage and wounded pride, —rushed after his big brother Bill and roused him and two other “big fellers” to arms in his defence, (with intent then and there to “lick” said coated youth,) did not the latter nobly stand the charge, and contest the ground inch by inch until forced to fly before superior numbers? And all from pure, disinterested pluck!—although he *did* retain the confiscated marbles.

In view of these facts, and because of the prestige which greater age and stature always command, our young friend regards the coated youth as a creature to be admired and looked up to, and is quite contented to follow in his wake, whether in idea, sentiment or action. And this is why his genius is not, at present, so distinctive as it some day will be. We say “as it will be” because there exists a beautiful law of compensation in these cases, which elevates the admiring small boy of to-day into the admired “big chap” of to-morrow, thus ensuring to each one of the adolescent community, a chance to occupy the glorious pinnacle of greatness among his fellows. Our young friend has plenty of genius in the germ.

Upon his immediate right, in happy indifference to the fact that his feet are guiltless of shoes and his pantaloons breaking out into a small perspiration of patches, sits an independent lad, enjoying his cigar with the gusto of a connoisseur,—allowing its aroma to escape through his lips in delicate and prolonged puffs, or rather exhalations, for your connoisseur never puffs; puffing implies haste,—and avowed determination to get through with the work on hand in a given number of minutes, and with cigars at their present price, haste is impolitic, not to say injudicious. Every feature in that boy’s face,—the arch of his eyebrow, twinkle of his eye, —the very set of his head on his

shoulders, says as plainly as words “*Civis Americanis Sum.*” Occupying such a position in the world, he feels his independence and the respect which his presence *ought* to inspire. He bristles all over with his nationality, and has a half undefined ambition to be wrapped in the American colors when he dies and have three volleys of American musketry shot over his grave. Having read “The Drummer Boy,” “The Young Pioneer” and other highly colored narratives of how ragged youngsters became generals and presidents, he has secretly applied the morals to his own case and has doubtless already reflected upon cabinet matters, and been harassed with grave doubts as to whether Jim Smith would make a good Secretary of State in the event of his own elevation to the Chief Magistracy. It having also come to his ears that Commodore Vanderbilt commenced life as a hand on a small fishing smack or oyster boat or other insignificant craft, he has given evidence of his own nautical proclivities by sundry “launches” of miniature sloops,—composed of a piece of shingle and an upright stick,—upon the rolling tide of a street gutter, to the untold gratification of his less enterprising and more youthful companions. He feels confident of achieving the Commodore’s success by following in the Commodore’s wake, and turns over in his mind the probable results of certain “corners in Erie,” and the margin to be netted from certain “bear combinations,” the plans of which are as yet but incipient ideas, yet considered not the less practicable for being so.

Oh, what golden dreams are cherished in the minds of the Rising Generation: how they build up air castles which the first gust of a later experience will be sure to topple down! How their most cherished ideas of fame and fortune,—their dearest dreams of position achieved,—of ambition realized, are doomed but to be undermined and fall!

Yet once in a great while these reflections are not verified, and we think this youngster, so nonchalantly smoking his weed, has as good a chance of realization as any similarly situated youngster we know.

And here let us say that we think it difficult to understand exactly why boys,—especially American boys,—exhibit so great a proclivity for the early use of tobacco. It is undoubtedly an acquired taste and therefore, whatever exhilaration and consolation may be the result of its use *after* its acquirement, such a reason for smoking cannot apply to boys like those who constitute our group.

The reason may perhaps be found in the desire inherent in youth to imitate the actions and habits of older persons, yet in this view of the case it is really marvellous to what lengths this desire will carry them and what tribulations they will go through in order to accomplish the process known as “learning to smoke.”

Cast a glance, for example, at the miserable and dejected personage upon the extreme right. He has started off with flying colors, has lit his pipe and puffed and puffed,—triumphantly at first,—afterwards determinedly,—finally desperately, until the utter misery of feeling very sick at one’s stomach has crowded all thoughts of pride and glory from his breast, and letting fall the hateful pipe, he leans his head upon his hands and ceases to feel surprised at the increasing number of suicides in the community.

He is conscious, just at present, of a remarkable and indescribable sensation of *gone-ness* immediately under the middle button in his shirt bosom,—a feeling indicating the want of something there, yet demonstrating to a certainty the existence of too much there,—a feeling pregnant with suggestions of rough sea voyages, and productive of dark mental calculations as to the efficiency and desirability of self-

slaughter in such cases as the present. The “inner man” is in a state of civil commotion, and his whole physical edifice seems intent upon getting outside of itself. How devoutly the poor fellow wishes he could get a friend to turn him inside out like a kid glove; but, alas! it cannot be done, and he has to be content with the gloomy satisfaction of wishing himself dead, and waiting almost hopelessly for the civil war within him to fight itself out and allow a return of the color to his ashy countenance.

This is “learning to smoke,” and “dost thou like the picture?”

Such an experience being usually necessary, however, to the acquirement of a habit so peculiarly American, it is not worth while to commiserate the case of this particular boy.

The young gentleman behind him, engaged in propping up the wall, is a character without whose presence no sketch of the Rising Generation could be said to be complete. He is ubiquitous. No knot of boys can gather at any corner but he is there, entering into every discussion, furnishing a theory for every proposition however abstruse, and answering, to his own satisfaction at least, every question propounded. He is always in the midst of every excitement, ready to profit by any item of news of sufficient importance to call for the publication of an “extra.” He is always the first on the ground at a fire, assisting with all his might in the invariable noise and jargon incident to a conflagration. He is always to be found in the third tier of the theatre, joining in the inevitable whistling and stamping which have to be gone through with before the curtain rises. He is very demonstrative in his applause and assists materially in the production of that nondescript murmur or howl which bursts forth from the upper benches when the sudden jump of the gas jets indicates a commencement of the overture. He is always crunching pea-nuts between the acts, and his pockets seem

to be inexhaustible in their supply of this variety of nuts. He always displays a consistent disregard for the requirements of society in the matter of dress. He is *not* a dandy. His cap is always too large for his head and his jacket too small for his body. His boots are too long for his feet and his pants too short for his legs. The latter articles of apparel are (to use an apothegm of O. W. Holmes) buttony in front and baggy in the reverse aspect.

With this youth a large scarf,—in place of a collar,—is chronic; without it part of his individuality would be gone; a dirty face is likewise constitutional, for being very active and quick in his motions, and therefore prone to profuse perspiration, and being in the habit of using his coat-sleeve or the back of his hand to wipe his face with, his naturally expressive features are speedily rendered more “marked” by the addition of sundry smears and smirks, which though giving depth perhaps to certain portions of his visage, cannot be considered an improvement to his countenance.

When not in use his hands are usually carried in his pockets,—first because he doesn’t own a pair of gloves and doesn’t want to, and second because, being a strict utilitarian, he approves of making use of all the available space left in his pockets over and above that occupied by their ordinary contents.

What miraculous things these pockets are! What capacious things; what things of untold depth! What treasure-houses of bits and ends; what emporiums of the world’s manufactures!

Why, that boy standing there so unconcernedly and so innocently has at this moment in his pockets, and could produce to view from their interiors, the following articles, which we give in *minutiæ*:

One jack-knife (one blade broken), one old pocket-book (containing two cents and a postage-stamp), thirteen marbles (assorted sizes), four bits of

string, two pieces of larger twine, two ginger nuts, one medallion of Seymour and Blair, one thumb-stall, one tooth-pick, one horn cigar-tube, one handkerchief (soiled), four buttons, two spools, one key, one tenpenny nail, two lath nails, one screw, one tin whistle, one peach-stone ring, one buckle, one piece of skate-strap, one pocket-comb (seven teeth out), two shoe-strings, and half a pint of pea-nuts!

This is a startling disclosure, reader, but we hold ourselves responsible for its veracity.

The position in which the young gentleman is at present indulging may be said to be his normal one; he finds it the very best position to smoke in, giving, as it does, a comfortable support to the back, and ensuring additional firmness to the spinal column, whose resources are called into play in the “pulling” necessary to keep the cigar and its fire from parting company. Moreover this position gives his legs less to do, and in a place where there are no chairs and under circumstances in which there is plenty of walking to be done, this is a desirable consummation.

These considerations have caused the adoption of this leaning position, and the habit has now become habitual. In fact his clothing is worn quite shiny from contact with the bricks of a dozen walls against which he has reclined during his moments of “masterly inactivity.”

He has just been regaling his companions with an accurate account of the magnificent performance which he witnessed last night at the theatre. (*Quære*; why is it that young gentlemen of this class invariably pronounce this word with a strong accent upon the second syllable?) He has given in detail to the attentive ears of his spell-bound auditors a description of the plot and development of the principal play. How *she* loved *him*, while *he* loved another; how her rival didn’t care a straw for her lover but adored her—the

heroine's—only brother; how that only brother, despising the evident attachment of the rival, was ready to lay down his life in a blind devotion to his cousin, the adopted daughter of a maiden aunt of sixty-nine summers who wore spectacles and false teeth and was worth a clear million in real estate; how the heroine exercised great influence over the brother and how the rival's happiness was thus placed in the heroine's hands; how the heroine, with noble self-abnegation (only met with upon the boards) used all that influence to promote the rival's interests, and how the rival's interests *were* thus promoted; how the heroine then gave herself up to a broken heart and melancholy and a table-spoonful of laudanum; how the hero,—who had just arrived from Hong-Kong,—stepped into the room at this particular minute and dashed the fatal draught from her lips; how the hero's unquenchable passion for the rival was transformed into implacable hate in the space of thirteen seconds by the watch, and how his indifference to the heroine developed into passionate devotion in ten seconds more; how a benevolent uncle,—until now residing in Kamp-schatka, or California, or oblivion, or some other distant point,—mysteriously made his appearance, at this juncture, to the delight of all the saints in the play and the consternation of all the villains; how the plot of the drama at this point became somewhat confused to the relator, but how it all came out right anyhow, and how the hero married the heroine, and the brother married the cousin, and the benevolent uncle married the wealthy aunt; and how the rival imbibed the remnant of the heroine's laudanum, and died comfortably out of the way, and how there was general rejoicing and hobnobbing, and a great amount of pouring nothing out of empty decanters into pasteboard goblets and drinking to each other's healths, and how the whole was concluded by a beautiful tableau in which the hero and heroine were the

centre figures, and over which was thrown the effulgence of crimson light as the curtain descended; together with other *minutiae* too numerous to mention, all of which was told with great unction by the narrator who is an excellent mimic and brimful of dramatic fire.

Then there was a synopsis of the scenery and stage business and description of the "mechanical effects" to be gone through with. How the rain storm was accurately represented by pouring shot into a coal-scuttle; how the lighting fulminated from the side scenes with a "puff" and how the zinc thunder's reverberation cracked everybody's tympanum. How the green muslin water of the lake danced in the rays of the candle moon, until half the audience commenced coughing from the dust which arose from the "water;" how the rival now made her appearance in a boat with one side and no ends, which she paddled with what looked like a cricket-bat; how the boat made its way through the green muslin in painful jerks, to the peril of the rival's equilibrium; how the final jerk, which pulled the boat off the stage, upset the rival over the gunwale, to the intense gratification of the entire family circle, which audibly, giggled, and how the parquet,—being disposed to overlook such accidents,—frowned upon the family circle;—all these matters being dwelt upon, with infinite gusto and satisfaction, by our friend, who has a strong *penchant* for the sensational in dramatic literature, and a decided admiration for scenic effect as an accessory to plot and dialogue.

But the stage does not so entirely engross his attention but that he finds plenty of time for critical observation of other matters and positive expression of his views thereon. His proclivities and prejudices are equally strong upon other topics. He is sometimes dogmatic, but usually logical, rarely partial and never equivocal. The lines of his character are all well drawn.

In truth these remarks apply with

equal fitness to this class of the Rising Generation in general.

The group as it stands may be considered a fair representation of the various divisions and stages of this class, and if we could form this group into a kind of congress and obtain a parliamentary expression of opinion from it, we should find it taking a fair, square and positive stand upon every issue of the day, and would discover, moreover, that the conclusions arrived at were the result of a regular system of logical deductions, and inferences from established facts.

These youths have an annoying habit of entering into the *reasons* of things,—a way of always wanting to know the *why* and *wherefore*,—which is sometimes a reproach to the more superficial modes of the highly educated student.

They don't believe in an effect unless they can find the cause; they must know the reason for everything. Like the little child who puzzled the great philosopher by asking him *why* B follows A in the alphabet, these boys puzzle us by demanding the reason why each fundamental fact *is* a fact. Though mentally our inferiors, they make us sensible of our own littleness by the *naïve* questions which they propound and which we find it impossible to answer.

The worst of it is they are too sharp to permit us to evade a question or to go *round* a point too knotty to go *over*; we must meet the issue face to face, and either find a satisfactory answer, or acknowledge our ignorance.

We cannot bluff them by eloquence nor elude their grasp by sophistry, for they have a natural wit frequently too keen for cultivated knowledge, and to which we have occasionally to surrender at discretion.

Those who constitute the Rising Generation demand attention at our hands. In elevating the poorer classes,—in keeping up their standards of morality,—the philanthropically dis-

posed man can find an ample field for his operations.

We must lift them above degrading influences and strive to engraft the benefits of high education upon the stock of their native wit and ingenuity; we must place them in a position which will open to them the avenues of advancement, power and emolument, for they are the corner-stone upon which will rest the future glory of a great Nation.

A BRONZING process, applicable to porcelain, stoneware, and composition, picture and looking-glass frames is performed as follows: The articles are first done over with a thin solution of water-glass by the aid of a soft brush. Bronze powder is then dusted on, and any excess not adherent is knocked off by a few gentle taps. The article is next heated, to dry the silicate, and the bronze becomes firmly attached. Probably, in the case of porcelain, biscuit, or stoneware, some chemical union of the silicate will take place, but in other cases the water-glass will only tend to make the bronze powder adhere to the surface. After the heating, the bronze may be polished or burnished with agate tools.

THERE is a cave in Corydon, Indiana, the entrance of which is only three squares from the Court House, connected with which is a singular phenomenon. A continual current of cold air comes out of the entrance which will keep a fan turning if it is suspended before the hole. During the recent hot weather some gentlemen placed a thermometer in the cave. In five minutes the mercury sank from nearly 103° to 58°. The cave has never been explored, consequently whence the current of air comes, or what causes it, remains unknown.

A RUSTIC SHELTER.

THE design here given is one of a class of park-buildings now becoming popular in this country. In the Central Park, New York, there are some good specimens of the arbor on a large as well as a small scale, and their effect is not alone artistic but conducive of comfort, as affording a delightful resting place for pleasure seekers.

The *Land Owner, or Journal of Real Estate*, a Chicago publication which is alike creditable to its publishers, and eminently useful to the community for whose benefit it was established, favors us with the cut of the arbor of which we now speak. It is rustic to a degree, and not the less pleasing on that account. The roof is covered with thatch, and is of a form so unique as to add considerably to its picturesque appearance.

We would strongly recommend as an extra feature in this art of rustic building the staining with bright colors the straw used in certain parts of the roof, such as bands, diamonds, and other ornamental figures. The combing of the roof should be finished in a manner according with the style. The floor should be either tiled or paved with very small stones in varied figures, and the seats should be rustic and fanciful, at the same time that comfort should never be sacrificed.

There is nothing affords the designer in landscape gardening freer scope for his genius than this rustic arbor construction, for nothing in building so perfectly assimilates with the surroundings of trees and shrubs; in fact it is the nearest approach which man makes to Nature's Architecture, and has a primitive appearance about it that at once wins the taste of all and takes the mind pleasingly captive. As we propose to follow up this subject in future numbers, we will add nothing more now than a

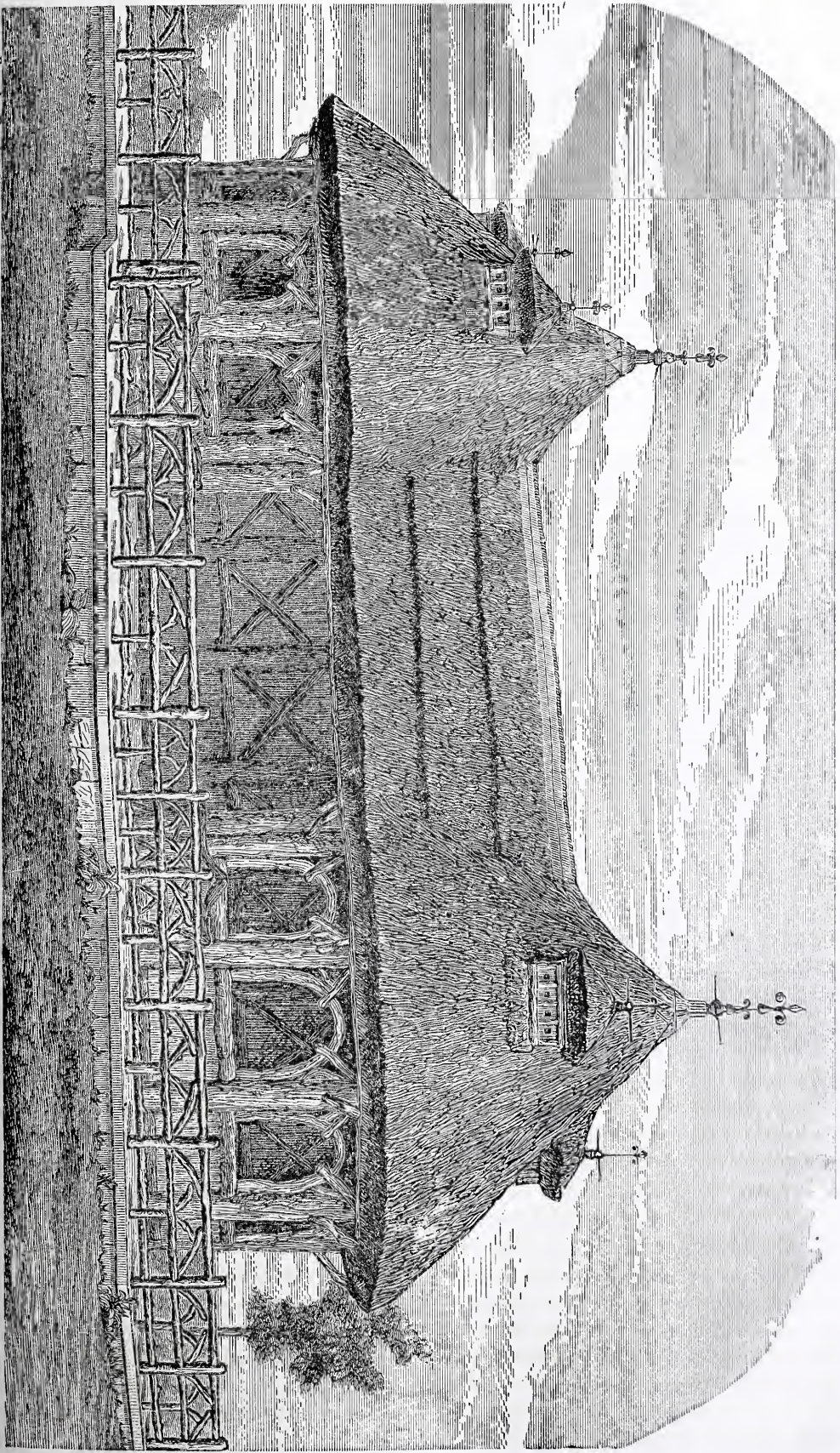
hope that the growing desire for parks and pleasure grounds may have the effect of drawing public attention to it.

ST. PETER'S CHAIR.—The London *Builder* says of St. Peter's chair at Rome:

"It is an old yellow oak chair, formed of four uprights united with horizontal bars, two being higher than the others, to form the back. The four oak legs were evidently once square, but they are much eaten away by age, and have also had pieces cut from them. These time-worn portions have been strengthened and rendered more ornamental by pieces of dark acacia wood, which forms the whole interior part of the chair, and which appears to have hardly suffered at all from the same causes which have so altered the appearance of the oak legs. The panels and the front and sides, and the row of arches with the tympanum above them, which forms the back, are also composed of this wood. But the most remarkable circumstance about these two different kinds of material is, that all the ivory ornaments which cover the front and back of the chair are attached to the acacia portions alone, and never to the parts composed of oak. Some of the ornamentations are attributed to the age of Charlemagne, and some, such as the Labors of Hercules in the ivory panels, are more ancient; the oak work is deemed likely to be as old as tradition states it to be. It is known that St. Damascus placed it in the baptistry of the Vatican, and considered probable that up to that period it may have been preserved in the crypt of St. Peter's tomb or to the Basilica of Constantine. It was moved from chapel to chapel on the Vatican before the days of Alexander VII., who enclosed it in the bronze monument, where it has since been hidden."

Eng. by Bond & Chardier, Ont.

RUSTIC SHELTER IN PROSPECT PARK, BROOKLYN.



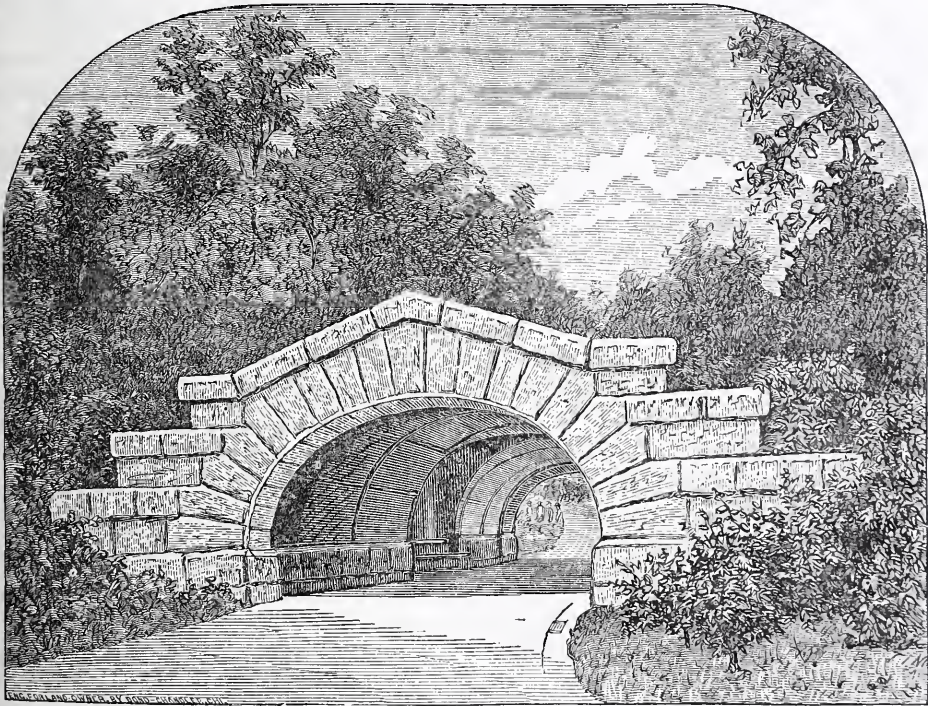


A PARK BRIDGE.

THIS pretty feature in the Prospect Park, Brooklyn, is one of those desirable reliefs for the eye, a resting place from the fatiguing observance of greensward, and grey walks, flowers, plants, shrubbery and trees. Scientific Art seems here to claim its share of public patronage with nature in its highly schooled condition. There are many of these tasteful structures in the Central Park, New York, and none that

the view up and down the charming little artificial valley, with its bright sloping sides flanking the well kept thoroughfare through which the happy stream of human pleasure seekers is passing gaily; or in seeking beneath them a cool seat, away from the over-coming heat of the sultry summer-day, what is there left to wish for?

Art seems to revel in this department of its calling, and the visitor to Central



have not merit of a high order both as designs and executed work.

The above bridge is of rusticated stone, put together in a style to at once present the appearance of permanence and simplicity.

Time will tint it and decorate it with those softening hues, with moss and ivy greens such as age is apt to surround those structures with; so that its very future is a bright prospect, as its present is a pleasant fact.

In a double sense these dry bridges are useful in parks, for in crossing them

Park sees with pleased wonder the works already done, and cannot but be impressed with the thought of what is yet within the magic power of design to compose, and of educated artisans to triumphantly carry out.

These parks are the schools of taste, wherein the masses will receive their teaching, and where the rising generation will imbibed those lessons which must fructuate, at no distant day, in the wide spread beautifying of our highly cultivated country.

We have the land in all its wide

expanse; we have the luxuriant growth of Nature's choicest trees and flowers; we have the climate, and the lofty cloudless zenith of cerulean blue; and we have the appreciative feeling which can liberally patronize such adornments of our leisure life. What do we want but the effort to urge on the beautiful reform thus begun and expanding its limitless resources.

THE SENSE OF BEAUTY.

BY CHANNING.

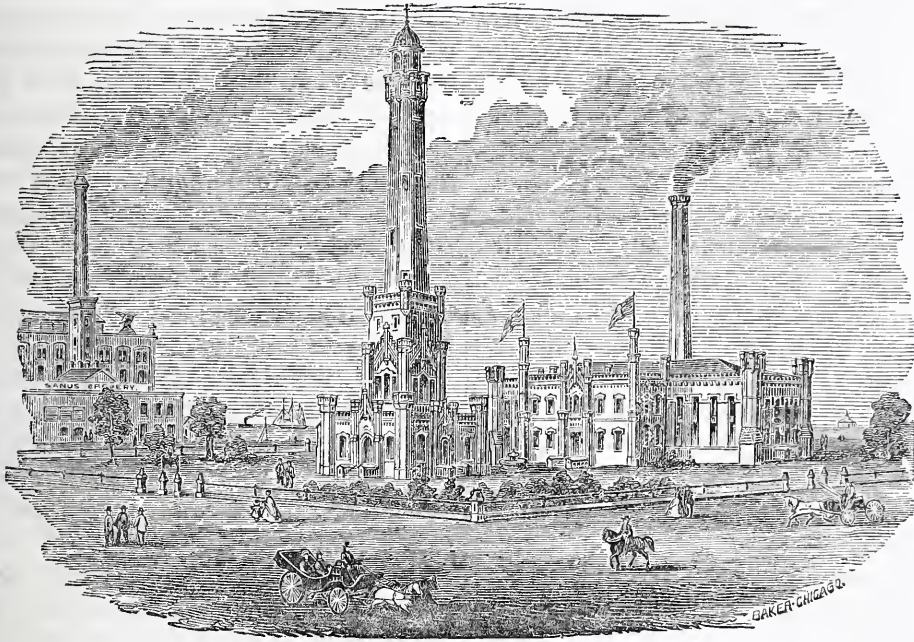
BEAUTY is an all-pervading presence. It unfolds in the numberless flowers of the spring. It waves in the branches of the trees and the green blades of grass. It haunts the depths of the earth and sea, and gleams out in the hues of the shell and the precious stone. And not only these minute objects, but the ocean, the mountains, the clouds, the Heavens, the stars, the rising and setting sun, all overflow with beauty. The universe is its temple; and those men who are alive to it, cannot lift their eyes without feeling themselves encompassed with it on every side. Now, this beauty is so precious, the enjoyments it gives are so refined and pure, so congenial with our tenderest and noble feelings, and so akin to worship, that it is painful to think of the multitude of men as living in the midst of it, and living almost as blind to it as if, instead of this fair earth and glorious sky, they were tenants of a dungeon. An infinite joy is lost to the world by the want of culture of this spiritual endowment. Suppose that I were to visit a cottage, and to see its walls lined with the choicest pictures of Raphael, and every spare nook filled with statues of the most exquisite workmanship, and that I were to learn that neither man, woman, nor child ever cast an eye at these miracles of art, how should I feel their privation; how should I want to

open their eyes and to help them to comprehend and feel the loveliness and grandeur which in vain courted their notice! But every husbandman is living in sight of the works of a diviner Artist; and how much would his existence be elevated, could he see the glory which shines forth in their forms, proportions, and moral expression! I have spoken only of the beauty of nature, but how much of this mysterious charm is found in the elegant arts, and especially in literature? The best books have most beauty. The greatest truths are wronged if not linked with beauty, and they win their way most surely and deeply into the soul when arrayed in this their natural and fit attire. Now, no man receives the true culture of a man, in whom the sensibility to the beautiful is not cherished; and I know of no condition in life from which it should be excluded. Of all luxuries this is the cheapest and most at hand; and it seems to me to be most important to those conditions, where coarse labor tends to give a grossness to the mind. From the diffusion of the sense of beauty in ancient Greece, and of the taste for music in modern Germany, we learn that the people at large may partake of refined gratifications, which have hitherto been thought to be necessarily restricted to a few.

THE HEMPSTEAD PLAINS ENTERPRISE.

—Mr. A. T. Stewart has contracted for five hundred miles of streets and roadways on his Hempstead Plains purchase, and proposes erecting thereon next summer, for the beginning of a town of workingmen's homes, five hundred dwellings, one hundred of which are to cost ten thousand dollars each. What a magnificent monument for generations to come will this grand work be to the chief of our merchant princes. May he live so see his undertaking fully completed, and the forthcoming town a city of fifty thousand happy and prosperous people.—*New York Herald.*

CHICAGO WATER WORKS.



THE site of the new Water Works at Chicago is the same as that of the old, with the addition of one hundred and eighty-seven and one quarter feet of land west of Pine street, which the board purchased of Mr. Lill, and upon which, covering both it and the old site, the new buildings, as shown in the engraving, now stand.

The erection of this magnificent structure, which cost sixty thousand dollars, delayed for several months the letting in of water through the Tunnel. This building should have been erected long before the two sections of the tunnel met, but the board considered themselves too much engrossed in that work, to undertake another before it was successfully completed.

A pumping engine elevating into the reservoirs eighteen million gallons of water in twenty-four hours, was placed in this building. This engine, the largest ever put up in the West, cost one hundred and twelve thousand three hundred and fifty dollars. It was built from designs drawn by Mr. Cregier, the

old engineer at the Water Works, and is a model of beautiful machinery.

We will now proceed to give some of the particulars of a work which the *London Times* correspondent, as well as that practical and well-informed mammoth contractor of public works, Sir Morton Peto, declared to be a more extraordinary piece of successful engineering than the Thames Tunnel. As a proof of American skill and perseverance we therefore give our readers the following simple story of

THE TUNNEL.

In the history of the world we find no city that has had greater local difficulty to contend with than Chicago. Located on almost a level with Lake Michigan, and having a river that might be more aptly termed a creek, so currentless is its water. No chance for basement or cellarage, and most daunting the prospect for foundations. Yet this city arose, conquered every difficulty, and overcame every obstacle, through a sheer spirit of indomitable energy which

knew no such word as fail. But the greatest trouble which Chicago had to contend with was the want of pure drinking water.

The astonishing growth of this young Babylon of the West soon made the currentless river a cesspool of filth, it being the receptacle of the miles of sewerage, the offal of the thickly inhabited city.

In midsummer the stench from this stagnant river became horrible, its water getting so thick and slimy that the steamers dared not use it for their boilers, but were forced to move out of reach of it into the lake to get their supply. In fact whenever it had been used by steamers, the most terrific explosions occurred frequently, and the papers had such as constant city items of the day.

This state of things was endured until 1863, when the citizens began to show a determination to do something. But the war cloud was then hanging heavily over the whole land, and men's thoughts were too much engrossed with that still greater trouble. Engineering skill was all absorbed in the military requirements of the hour, and wealth was pouring into the one exclusive channel.

However the case was too pressing, and too replete with the discomfort of Chicago to be long suffered to have an existence, and an amendment was made to the city charter on the 13th day of February, 1863, giving power to "construct such aqueducts along the shore of Lake Michigan, or in the highways, or elsewhere in said Cook county, and to construct such pumping works, breakwaters, subsiding basins, filter beds and reservoirs, and to lay such water mains, and to make all other constructions in said county, as shall be necessary in obtaining from Lake Michigan a sufficient and abundant supply of pure water for said city. To extend aqueducts, or inlet pipes, into Lake Michigan, so far as may be deemed necessary to ensure a supply of pure water, and to erect a

pier or piers in the navigable waters of said lake, for the making, preserving, and working of said pipes or aqueducts." Congress sanctioned this action of the Illinois State Legislature, January 16th, 1864, and thus the Lake Tunnel became a probability. The following June the nature of the bottom was ascertained, which proving satisfactory, Mr. CHESBROUGH's idea of building a tunnel into the lake was shown to be practicable, and at once put in due scientific shape in maps and specifications, followed by advertisement for bids for building the work.

DULL & GOWAN, of Harrisburg, Pennsylvania, were declared the contractors, at \$315,139; they being the only bidders out of seven who would take all the risks of soil, quick-sand, or unlooked-for obstructions.

And this with the fact before their eyes, that in the government work of the cutting out, or deepening of the channel of the *Sault St. Mary*, a few years before, the contractor, Colonel BARTON, of Buffalo, N. Y., came near being ruined by the occurrence of a certain extraordinary tenacious blue-clay, which resisted the dredging process to such a degree as to threaten to prolong the work *ad infinitum*, and which was only obviated by the changing of the channel line.

On the 5th of October following, the Common Council authorized the commencement of the work, and the preliminaries were signed and sealed on the 28th of October, 1863. The first shovelful of earth was removed on the 17th day of March, 1864.

The location of the shore shaft was on the site of the old pumping works, at the east end of Chicago avenue, directly on the lake shore, about half an hour's walk from the Court House.

Messrs. DULL & GOWAN, the contractors, now entered zealously upon their great enterprise. A shaft about nine feet in diameter was sunk, on the above site, a short distance from the shore of the lake. When the workmen

had descended a short distance into the earth, they encountered a bed of shifting quicksand, which for a time defied all efforts at excavation. It was originally intended to construct the shaft wholly of brick, running it down from the surface of the ground, to a depth of fifteen feet below the level of the bottom of the lake, but encountering the quicksand compelled the abandonment of this method. The contract was consequently deviated from, and the contractors were authorized to run down an iron cylinder of the same dimensions as the centre of the crib, as far as the bottom of the sand bed, about twenty-six feet. This inlet cylinder is nine feet in diameter, inside and two and a quarter inches thick. It is cast in four sections of about nine feet in length. The great labor of sinking these sections will be apparent to all. From the bottom of the cylinders, twenty-six feet, the shaft was continued into the earth until it reached the depth of sixty-nine feet, being constructed of brick from the point where the iron cylinders ceased.

This shaft is not unlike an immense well. It was destined to be the great highway through which the clay excavated from the tunnel proper should be conveyed to the outer world, and much satisfaction was felt by the contractors when this bare commencement of their great work was accomplished.

Over the mouth of this shaft, a rough, temporary building was erected, large enough to contain a steam engine of great power, the office of the contractors, and the bricks, cement, tools, etc., used by the workmen. An elevator was now constructed, which carried the miners up and down the shaft to their work, being propelled by the engine. Stepping upon this platform, half a dozen hardy miners, carrying each his little lamp, pick and shovel, would descend far beneath the view of the spectators to their labors in the bowels of the earth. The clay which they excavated was brought up the shaft in the same manner,

and the brick, cement, etc., carried down.

At the bottom of the shaft water soon began to ooze in, and it became necessary to construct a pump, which was worked by the engine, and which kept it dry.

At the depth of sixty-nine feet, the workmen stopped, and the shore "shaft" was pronounced a success. Here began that nice engineering, which one of the editors of the *London Times*, who had visited the tunnel, pronounced "the greatest of modern times."

The point in the lake where the tunnel should receive water had already been fixed, by means of soundings, and buoys marked the spot. An imaginary straight line was drawn, which the tunnel was to follow from the point where it crossed the shaft, which was little less than prolonging a straight line nine feet in length, without deviation, until it reached some point two miles ahead. The compass, the natural reliance of man upon the lake, could not be relied upon *under* the lake. Local attractions of the earth would render it uselessly inaccurate, so far as giving anything more than a general direction was concerned. The only method of procedure was to run the axis of the tunnel parallel with the straight line drawn over the lake, which was only observable at the point where it crossed the shaft.

With this, to less scientific minds than those engaged in the great work, frail reliance, the miners struck their picks into the hard clay at the bottom of the shaft, and excavating was commenced directly lakewards. The clay was thrown upon the elevator before mentioned, and drawn up the shaft, while an ingenious apparatus was arranged which carried it off and "dumped" it.

The width of the tunnel, when bricked up, was decided to be five feet, and its clear height five feet two inches, the top and bottom arches being semi-circles.

Two miners were all that could work upon the excavation ahead of the masons who laid the brick, and they were relieved at regular intervals, so that the work should not stop for a moment. The brick masonry, which followed the miners as fast as they advanced, was eight inches thick, the bricks being laid lengthwise of the tunnel, with toothing joints, to give it greater strength and durability. Between this masonry and the sides of the excavation, as much of the earth was forced back as possible. The lower half of the bore was constructed in such a manner that the bricks lie against the clay, while in the upper half the bricks were wedged in between the bricks and the earth, thus preventing any danger which might result from the tremendous pressure which it was feared might burst in the tunnel.

The material used in the masonry was white Illinois brick, of the usual size, laid in cement. The tunnel was to have a slope from the "crib," or lake terminus, to the shore, of two feet to the mile, to admit of its being emptied in case repairs should at any future time be necessary, the water being shut off by means of gates at the lake end.

In this slow and tedious manner, the workmen made their way under the lake, from fourteen to twenty feet being considered great progress for twenty-four hours, the work being continued night and day. Before they had advanced far from the shaft, the air began to grow impure, and each day the difficulty increased. Here was an obstacle of no small moment to encounter. A large steam bellows was obtained, and placed at the mouth of the shaft, from which piping, not unlike ordinary stove pipe, was run down the shaft, branching off into the tunnel. This tube was perforated with holes, in such a manner that the operation of the bellows extracted the impure or dead air from the tunnel, causing pure oxygen to fill its place, which in turn was carried off by the

pipe, when it was consumed by the lungs of the workmen. As the tunnel progressed, this pipe was lengthened, and thus a constant supply of pure air was obtained.

Soon it became necessary to provide some more rapid means of transporting the earth from the face of the excavation to the shaft. Rails were laid down, and small cars placed upon them. At the commencement these cars were propelled to the shaft by workmen, where they were drawn up, and their contents discharged. But as the distance increased, day by day, and new lengths of rail were added, other means of locomotion were sought. Much to the edification of the laborers, two small mules were purchased, which could barely stand between the walls of the tunnel, without rubbing their ears. After some little schooling, these tractable animals were placed upon the elevator, and lowered into the earth. After a little experience and training, they learned their work and performed it well.

Several cars at a time were now loaded, and the mules attached, which drew them to the shaft. A regular railroad time-table was prepared, to avoid collisions, as it was impossible for any person entering the bore to pass the "down" train, should he be so unlucky as to encounter it in the bowels of the earth. At the shaft, the mules were turned around, and the train of empty cars were drawn back. These mules and their long train of cars, presented a very picturesque appearance, each of them wearing a small lamp upon his collar, which served for the calcium light before the engine. This submarine railroading will be further spoken of in another place.

When the tunnel had reached the distance of one thousand feet from the shaft, a sort of chamber or stopping place was made, where the excavation was enlarged, to afford a deposit for the material used, a place to mix the cement, turn-tables for the cars, stables for the

mules, etc. These were left at the distance of one thousand feet apart, to be bricked up when the whole work was completed. The distance was marked upon the inside of the bore, as fast as the work progressed from the shaft, every five feet.

The "crib," as it has been commonly called, was built on shore, and launched, much like the *Great Eastern* or any other sea-going hulk. It is composed of huge timbers and tons of iron, no expense being spared to make it strong; it is forty feet and a half high, and built in pentagonal form, in a circumscribed circle of ninety-eight and a half feet in diameter. It was constructed with three walls—the outer, the centre, and the inner—making it almost like three distinct structures, one inside the other, and all firmly braced and bolted together, so as to constitute one great structure. Each of these walls was calked and tarred, like the hulk of a vessel. They were constructed of twelve-inch square timber, the first twelve feet from the top of white oak, and the remaining twenty-eight feet of white pine. Each piece of timber comprising either wall was firmly bolted in its place with square rods of iron, one and five-sixteenths of an inch in diameter, and thirty inches long. The bottom was composed of twelve-inch timbers, held in place by bolts thirty-six inches in length, passing through three distinct layers of timber. The whole framework was a combination of massive timbers and irons, firmly held together by bars and bolts, and braced in every direction. When finished it contained fifteen separate watertight compartments. In the centre was a "well," open at the bottom and top, through which the shaft was to descend into the bottom of the lake.

Each angle of the crib was provided iron armor, to protect it from ice or any other body borne upon the waves. This covering was of iron two and a half inches thick, and covered the structure two feet each way from the angles, and

extended downwards from the top twelve feet. This armor was fastened to the outer wall of the crib, and the adjacent timbers by iron bolts thirty inches long, and to the inner wall and its timbers by round iron bolts, an inch and a half in diameter and thirteen and a half feet in length.

That people may form a correct idea of this immense structure, and the importance it possessed in the great work, we give a few items of the timber and iron used in its construction. It cost not far from one hundred thousand dollars before it was moved from the stocks. Reduced to board measure, there were used in building it 618,325 feet of lumber, as follows:

538,368 feet white pine timber.

42,000 " white oak timber.

20,000 " two-inch white pine plank.

18,000 " two-inch white oak plank.

Besides this, there were used five hundred bales of oakum, and sixty-five tons of iron bolts.

This immense structure, almost as large as the Chicago Court House, was built like a vessel, on the north pier, a short distance from the mouth of the river. On the 24th day of July, 1865, an immense concourse of people gathered on the spot to see it launched. So great was the interest felt in its being successfully put in position, that merchants left their counting-rooms and hurried to the scene. Thousands of people were present, standing upon the house-tops, riding upon the river in yawls, and seated in carriages upon the banks and piers.

When filled with stones it was as immovable as Gibraltar. Reaching down to the clay bottom, the water being about thirty feet deep at this point, several feet of the structure remained above the surface of the lake. As winter approached, the top of the crib was covered by a house, constructed with a cupola, where a light and a fog bell were kept at night to warn the mariner of his position, which the law now requires the city authorities to constantly observe.

Tug-boats plied between the crib and the city, carrying out supplies to the workmen and conveying visitors to the wonderful island.

The next end to be obtained was sinking the cylinders in the crib, in order that tunneling could commence in both directions. The winter of 1865 was at hand. A large quantity of brick and mortar were taken out and piled upon the crib, as well as provisions for the men; it being anticipated that when winter set in, the ice would not permit of reaching the crib for months at a time.

The "crib" was now in its place, anchored securely in the lake, two miles from the shore shaft. Every day the workmen in the "bore," or tunnel proper, were progressing towards it, slowly but surely overcoming the impediments in their way, and gradually becoming more inured to their close and somewhat dangerous quarters.

The huge iron cylinders, which were to form the lake shaft of the tunnel, were at length got out upon the crib, after much vexatious delay and expense to the contractors. These cylinders are nine feet in diameter, and the iron is two and a half inches thick. They were cast at Pittsburgh, Pa., in nine feet sections, their immense weight rendering it otherwise impossible to move them. The end of each section was provided with a heavy flange, through which it could be bolted to the one below it, similarly constructed. These cylinders are seven in number, their respective weight being about eleven tons. The iron is used in bolting them together were one and a half inch, cemented as well as riveted in their places.

These immense cylinders once placed upon the crib, the next step was to get them in place in the centre compartment of the structure. Mr. Bramhall, one of the engineers, solved the problem, inventing machinery and tackle for the occasion. The cylinders were partially suspended over the chasm in the crib by this tackle, then swung upon ways

and supports of timber, in which manner they were at last placed in position and firmly riveted together. After reaching the bottom of the lake, on which the crib rested, being sunk into the clay several inches by its immense weight, these cylinders, or sections of the shaft, were sunk into the ground twenty-seven feet, in much the same manner as the shore shaft was built, at which distance they reached the required depth, leaving a fall of two feet to the mile, in a straight line drawn to the bottom of the shore shaft.

A complete shaft in the lake was thus formed, by means of the crib.

Winter was now rapidly approaching and threatening to lock the lake and river in icy armor. Consequently, every means of getting winter supplies to the crib before the river should freeze up, and stop the running of the tugs, was resorted to. A large supply of brick, cement and other material used in making the tunnel, was taken out and stored in the building upon the crib. It being anticipated that months might elapse before the miners could communicate with the shore, a commissary department was thought necessary, and all kinds of provisions were likewise transported to the crib, in sufficient quantities to satisfy the hunger of a large number of laborers for some length of time. The services of a cook were also procured, a kitchen commissariat fitted up, and every thing put in complete order for the winter campaign under the lake.

Colonel Gowan had prepared three earth cars for the voyage under the lake. These vehicles were about three feet long and two feet wide, and, when used for carrying passengers, were expected to hold four persons. On this occasion they were upholstered with blankets and buffalo robes, and were quite comfortable to travel in.

The cars were brought forward, placed upon the elevator, and four persons got into each one. At last as they were

filled they descended into the shaft; the explorers bidding adieu to those behind as their heads went down out of sight. When the cars were lowered to the bottom of the shaft, they were rolled off into the tunnel proper, as they came down, and coupled to each other, like a railway train, on a genuine track extending the whole length of the bore. When every thing was in readiness, or, as Superintendent Rice said, when the train was made up, a diminutive mule was attached, and a miner with a little lamp on his hat drew rein over him, gave a shrill whistle, and the train moved off into the subterranean darkness.

"Now we are under Lake Michigan," said Colonel Gowan, and the mule was given the whip. Off went the cars at a breakneck speed; into the darkness, into the bowels of mother earth, under the waters of the lake. The rapid motion caused a current of air, which relieved the damp sensations of the place.

After a journey of fifteen minutes, through a straight, dark road, at a cantering speed, the train emerged into the last chamber, which was lighted by innumerable little lamps. The miners looked bewildered at the strange advent, and laughed outright as the parties stepped from the cars, and shook themselves. Colonel Gowan announced that they had about four hundred feet further to traverse on foot, before they got to the extreme end of the tunnel. Taking a lamp, he led the way. The long men in the party doubled themselves up and followed, and the short men bent their heads very low. "Tramp, tramp, tramp," until backs and legs ached, and at length the extreme end of the tunnel was reached. About twelve feet was dug into the solid clay, and the miners who stood about the weird place like so many spectres, were engaged in bricklaying and cementing. Colonel Gowan announced that the party were then three thousand four hundred feet from shore, under Lake Michigan. Bits of the clay were pock-

eted as trophies, and the party retraced their steps.

The cars were re-entered at the first chamber, where the party left them, and off went the train in the direction of the shaft, at the rate of 2.40 per mile. The mule, which wore no breeching or back-strap, suddenly paused, when the train was at its greatest speed. The cars ran upon the animal's heels, and those in the forward car had the pleasure of receiving him into their laps, nearly frightened out of his mulish wits. Colonel Gowan, the conductor of the train, got out, and went ahead to see what had frightened the "locomotive." A shout told the party that some joke was in store for them. He returned to the cars with Senator Chandler's hat, which had been blown off and left on the track during the outward voyage. The mule was not used to such a strange sight, and nearly caused an accident to the passengers.

On Saturday, the 24th of November, 1866, the morning papers informed the citizens of Chicago, that the two sections of the tunnel had progressed so near to each other, that but a thin wall of clay remained to divide them. The glorious result sent a thrill of joy to every heart, and the telegraph carried it to every quarter of the globe.

The greetings of the two parties that thus met under the lake, can be better imagined than described. There were hearty hand shakings, joyful congratulations, and loud huzzas, which resounded through the cavernous depths. Mr. Offerman, superintendent of the work, was the first who stepped from one section to the other of the tunnel. The joy of the contractors, at this happy termination of their gigantic labor, cannot be described with any sort of justice. But they were not more pleased than were the people of Chicago when they heard the glad tidings. The party that had come down *via* the crib, consisted of Mr. Dull, Mr. Bramhall, and others, proceeded westward, and soon arrived at the shore, being the first who passed

completely through the tunnel, from the crib.

On the night in which it was anticipated that the tunnel would be completed, the gang of workmen were in charge of E. W. Offerman, son of the superintendent. That gentleman had received instructions to pursue the excavation to a certain distance, and then leave it. Twice had he measured and found that he had already permitted the workmen to go forward to the farthest extremity, and yet the rod driven from the other side had not been reached. What was to be done? Had all their calculations been for naught? Was the shaft larger than had been supposed, or had the true course been deviated from? Seizing an augur near at hand, he thrust it into the clay, and commenced boring. A few turns, and it gave way before him as the point was faced upon the other side. The "trimming out" process revealed the iron rod, and the workmen returned to the mouth of the shaft to make the early morning ring with their rejoicing.

The completed tunnel may well be considered a wonder of engineering. It is composed of two million six hundred thousand bricks. Ten thousand four hundred and sixty-seven barrels of cement, or one barrel to every lineal foot, were used in laying the masonry.

When put in operation, it passed from the lake to the shore, under a two-foot head, nineteen million gallons every twenty-four hours; under a head of eight feet, thirty-eight million gallons; and under eighteen feet head, seventy-five million gallons. The velocities for the same quantities being one and four-tenths mile per hour, when the head is two feet; two and three-tenths miles per hour, the head being eight feet, and four and two-tenths miles per hour, the head being eighteen feet. With a head of eighteen feet, it is capable of supplying one million of people with fifty-seven gallons of water each and every day, a

capacity equal to any water works in the world.

A CHARCOAL flower-pot has been patented in England. The charcoal is moulded into the approved form in such a manner that its peculiar porosity may be in no way interfered with. By this means, not only is the oxygen of the air allowed free access to the soil within the flower-pot, but the water with which the soil is moistened is, by the filtering and purifying powers of the carbon, deprived of all those "hard" qualities which are known to be so deleterious to the growth of plants. Further, the sulphurous vapors, which are usually present in the atmosphere of large towns, and constitute the principal reason why floriculture is attended with so much difficulty in all cities heated with coal and lighted with gas, are, by the use of the charcoal flower-pot, fixed in the pores of the carbonaceous sponge. Hence, not only are pure air and pure water issued to the plant; but, all noxious vapor being removed, it follows that a healthy and vigorous growth and luxuriant development cannot but ensue.

THE recent terrible coal-mine accident at Avondale, says the *Eastern Free Press*, calls to mind a former great accident in Pennsylvania mines, which occurred in Carbondale in 1850. A large mine caved in, destroying over a hundred lives, and ruining the mine. When the cave-in occurred the pressure of air from the falling mass was so great that it blew a boy and a mule an eighth of a mile. A few of those entombed worked their way out through all the dangers of fire-damp and foul air, but the most of them perished by starvation, or fell a prey to the rats, which in coal-mines grow to an enormous size. One man was seven days in digging his way to the surface.

ESSAYS ON LANDSCAPE GARDENING.

BY H. W. S. CLEVELAND. No. 2.

THE almost universal prevalence of the evils of which I was speaking at the close of my last communication—of planting too thickly and neglecting to thin out in season, are of sufficient importance to demand a special discourse. And yet they have been pointed out and preached at by so many writers,—for so many years, and with so little apparent effect—that the renewal of the attack seems almost hopeless. I do not know a more striking proof of the general want of observation of things not immediately connected with the daily necessities of life, than is evinced in connection with this very point. No man who ever sees trees growing singly or at such distance from each other as allows them to develop themselves naturally, and compares them with others growing in a wood, can fail to perceive how completely the beauty of the individual tree is destroyed by association. It is so obvious, and so continually thrust upon the sight, that it would seem not only unnecessary but almost impertinent to call attention to it and explain its causes, were it not that multitudes of men are not only blind to the fact, but even when it is pointed out to them are either incapable of applying the lesson it affords, to the planting or thinning out of trees, or have not moral courage to do it. I know of no single item in the whole practice of the landscape gardener's art, in which the ruinous effect of a violation of a natural law can be more easily demonstrated, and none which is more constantly disregarded. Let any one select a really fine specimen of almost any variety of deciduous or ever-green tree, such as are commonly used for ornamental purposes,—oak, elm, maple, tulip, chestnut, or pine, spruce or hemlock. He will find it standing

by itself or at least at sufficient distance from other trees to have the full benefit of sun and air which are essential to its perfect development. Its massive trunk has attained a size proportional to the wilderness of branches and spray it has to support. The lower branches spring from the trunk at so low a point and spread themselves abroad on every side to such an extent as to form a symmetrical base to the pyramid of foliage which rises from it and forms as a whole the most majestic image of strength, which is yet so gracefully proportioned that its vast size is not appreciated till we come to measure its area and estimate the weight of timber it sustains, and the strength required to uphold it against the fury of the storms with which it has battled perhaps for centuries.

For the most part such trees will be found in out of the way places, where they have been suffered to remain simply because they were in nobody's way,—and the most common exclamation of the visitor is a reference to the incalculable value it would possess—"if it were only near the house." Then why not imitate in our plantations near the house the method which nature points out to secure such a growth? Having sufficiently studied such an object to have attained a realizing familiarity with the characteristics which constitute its attractive charms,—go next to the nearest full grown wood and study the manner of growth of the same varieties of trees. They will be found running up forty, fifty or sixty feet without a limb, the trunk straight and smooth, and so slender in proportion to the height, that were its neighbors cleared away from around it, its strength would be hardly adequate to support the tuft of spray which crowns its top—the only point where the sun and wind can reach

it, and therefore the point which every tree in the wood is struggling to attain, while below a wilderness of dead branches attests the necessity of light and air to the very existence of foliage, by showing how the growth of successive years has perished in the shade and shelter of that which followed.

And yet with these facts before their eyes, men go on planting trees within five or six feet of each other, which are capable of filling a circle fifty feet in diameter, and even when those trees, or others comprising a natural growth of young wood which might be developed into a park-like grove of greater attractive interest than all the artificial adornments which money could procure, have attained such a size that they begin to inflict upon each other the injury which can never be remedied, it is rarely the case that a proprietor can be induced to commit what he considers the "vandalism" of thinning and opening.

Another error in planting which is continually committed, resulting from the same want of reflection as to the space the tree will occupy when full grown, or even before it is half grown, is the putting them too near the buildings, avenues or paths which they are intended to adorn. This is particularly the case with evergreens, and is more reprehensible with them than with deciduous trees, because the latter may if necessary, have the lower obtruding branches trimmed off without necessarily destroying the characteristics which are essential to their beauty, but an evergreen is a deformity in a landscape if it is trimmed up so as to expose the bare trunk.

There is not a city or large town in this whole country which has not within easy access of its limits young groves and woods of greater or less extent, which by proper thinning and opening might be rendered so attractive and beautiful as sites for villa residences as to increase their value almost incalcu-

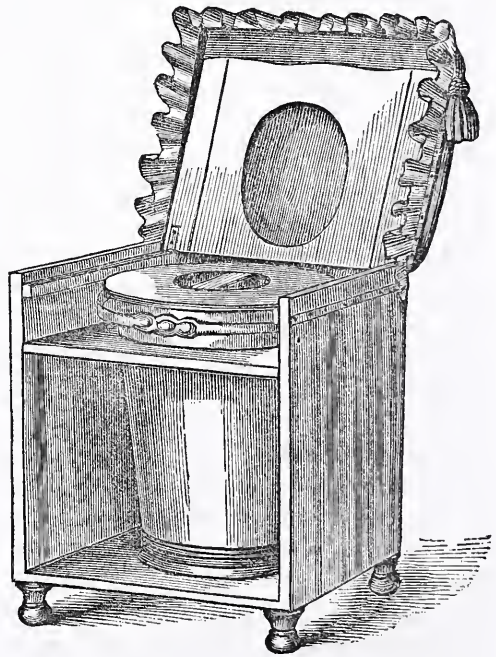
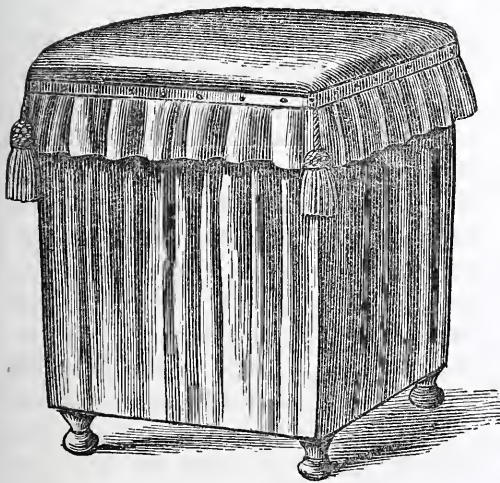
lably, while the wood thus taken from them would more than pay for the labor; but it is never done, because we have no general realizing sense of its necessity. Agriculture as a science is in this country practically unknown. The forest is suffered to grow and the trees to choke and kill each other in its interior, while the outer ones are beautifully clothed with foliage on the open side so that till they are removed the whole presents from the exterior a mass of luxuriant verdure. But when any portion of this exterior line is removed, as must usually be done to secure the best building site, a ghastly array of skeletons is disclosed, which the proprietor perhaps vainly strives to relieve by planting what he hopes will form an undergrowth of evergreens, in which he will certainly be disappointed, for no evergreen trees will ever thrive in such a situation, though they may preserve enough life to prevent the owner from giving orders for their removal, they will always present a meagre, wretched look which will serve only to add to the ghastly aspect of the scene. The only means of relief—(and it is often an invaluable resource, and yet one that is rarely practiced)—lies in planting groups of rhododendrons, ralmias and mahonias,—which if the soil is properly prepared will grow vigorously in the shade of woods, with occasional external groups of large shrubs or second size trees, as the cornells, viburnum, flowering dogwood, hop, hornbeam, etc., which in time will effect the desired object,—much may be often done also by topping such trees throughout the wood, as still retain a degree of life in their lower branches, and clearing away the trees in their immediate vicinity to allow them to develope laterally. Some trees are much more vigorous than others when growing in a wood. The beech is particularly so, and may often be found with a fine development of lateral branches even when closely surrounded with other trees. The white

oak also is not easily forced to abandon its natural habit of throwing out horizontal branches,—but the maples, chestnuts and tulips, require an unobstructed exposure to sun and air, and are sure to lose every limb that is deprived of it. No more magnificent specimens of trees could be imagined than some of the chestnut and tulip trees which may be

found in out of the way places where they have been undisturbed by human hands, and uninjured by the elbowing of neighbors,—while the same varieties in a wood even of small extent and comparatively open, will run up to great height with spindling trunks as straight as arrows, but without a branch except at the top.

HOUSEHOLD ECONOMY.

A PATENT COMMODE.



IN dwellings devoid of the accommodation of the water closet; or in cases where the location of the water closet is at an inconvenient distance from the chambers, the commode is a most useful piece of furniture. Whether in the sick-chamber, or as an appendage to the small tenement, it is equally desirable, and the design here given is well adapted to the purpose, being as it is shown above in its closed appearance, a very neatly upholstered article of furniture, ornamental as well as useful.

This illustration shows the commode in its nakedness, unupholstered and unclosed. It will be here seen that this article of furniture holds an air-tight bucket, the cover of which, when shut down, is perfectly enclosed by the cover of the case, into which it fits, (as shown.) The handle encircles it when not used. Mr. J. GILBERT, 429 Walnut street, Philadelphia, is the inventor of this very desirable household friend, and will promptly correspond with parties at a distance regarding it.

A COLOSSAL MARKET.

YEAR by year the question advances itself to a foremost rank in public consideration that a superior class of market accommodations is imperatively demanded in this great city, and is bound in some manner to be secured. Hitherto, as is well known, this immense emporium of the commerce of a continent has been afflicted with the vilest and most inefficient system of market accommodation on the whole broad earth. Philadelphia, Boston, Chicago, and especially San Francisco, have kept immeasurably ahead of New York in this regard, and yet no city could so well afford, or was under so great an obligation to furnish market conveniences as this. The products of thirty-seven States make New York their objective point. The cattle of Texas and of the Illinois prairies make their way here. The other day from the distant valleys of California a cargo of grapes and pears came rolling across the Continent, and glutted the fruit stands of Washington and Fulton markets. North, South, East and West contribute the supplies that feed a million mouths, and satisfy the countless demands of taste and luxury. Under the circumstances, New York should have the grandest and largest receptacles and dispensing places of these multifarious and endlessly arriving products which her citizens are desirous of trafficking in, and to a large extent consuming. Above all should the market accommodation be ample and complete, clean, light and spacious. Heretofore we found that the people of New York were apparently satisfied with such market accommodation as could be found at Fulton or Washington. The moment, however, that an innovation was attempted and its results somewhat appreciated, a general desire sprang up to make the convenience more extended, and to give to

the community at large its benefits and its blessings. The city government has decidedly failed to furnish that necessary and complete convenience of supply and arrangement of supplies, that the requirements of this large population demand. Private corporations have in many instances come to the rescue, and in the case of the Thirty-fourth Street Market, which this notice embraces, show the vast superiority of private over public enterprise.

New York is at last to have a market, which will be worthy of the commercial capital of the continent. A company of enterprising gentlemen, organized under the name of the Manhattan Building Company, is about erecting a magnificent structure, at the foot of Thirty-fourth street, North river, to be called Manhattan Market. The property secured for this purpose is bounded by Thirty-fourth and Thirty-fifth streets, Eleventh avenue and the North river, and comprises about eighty city lots, with bulkhead and river front of 200 feet, with all the water privileges. The main market will cover the whole block from Eleventh to Twelfth avenues, and between Thirty-fourth and Thirty-fifth streets, being 800 feet by 200, or 160,000 square feet. This will be the largest building under one roof on this continent. The open market will be bounded by Thirty-fourth and Thirty-fifth streets. Twelfth avenue and the Bulkhead line, being 200 feet long by 100 feet broad, and presenting a superficial area of 20,000 square feet. This will be covered by a roof of felt and gravel, with abundant ventilation, and is to be floored with pavement flagging.

The dock to be used, constructed for the special use of the market, will be 300 feet long from the centre of the bulkhead, and 38 feet wide, thus giving ample facilities for the loading and un-

loading of market produce. No finer location could be found in this city for the purpose, as ere many years Thirty-fourth street will be the central line of the metropolis. The foundation will be on piles and concrete; the sill course of Lockport stone or granite; the walls, of brick, 24 inches thick and faced with the best Philadelphia, 26 feet high at the Eleventh avenue end, and 34 feet high at the Twelfth avenue, owing to the grade of the street. There will be 106 doors and windows on Thirty-fourth and Thirty-fifth streets, and 30 on Eleventh and Twelfth avenues, the centre ones being the largest, the whole arched with brick and Lockport stone imposts and keystones; the doors of ornamental iron, and the windows of glass; the cornice of ornamental brickwork, and metal eave troughs; the four corners flanked with towers of ornamental iron-work 70 feet high. The centre of the Thirty-fourth and Thirty-fifth street elevations will be carried up three stories, or 70 feet high, and be 110 feet long by 30 feet deep, to be reached by iron spiral staircases, and to be used as offices, restaurants, or for other purposes. The centre, on Eleventh and Twelfth avenues, will also be carried up three stories, with an iron cupola, the whole being 112 feet high, and 100 feet long by 26 feet deep. These elevations being supported from the inside by iron columns, will not interfere with the main floor of the market. The roof will consist of three spans or arches of wrought iron lattice work, supported on iron columns. The centre span of 100 feet, dome shape, and 75 feet from the floor; the side spans 50 feet each, and 38 feet from the floor. A continuous range of circular-headed ventilating windows, eight and ten feet high respectively, around the whole building, both on the centre of the side spans and on the crown of the main roof; six patent ventilators, eight square, at equal distances along the ridge; thus making not only a grand and elegant roof, but

affording abundance of light and ventilation.

The clock tower, of iron, which will rise from the centre to the main roof, to be 34 feet at the base and 192 feet high. The covering of the roof to consist of narrow inch and a quarter tongued and grooved white pine, covered with English felt and roofing tin.

The whole building to be lighted inside by 700 gas burners, and outside by 150 globes over the centres of the doors and windows. The main floor laid with French asphalt, with all the proper arrangements for water and drainage. The number of stalls on the main floor inside the building 1,200 in round numbers.

The building will be of the Byzantine style of architecture, simple in construction and grand in effect, eclipsing all previous market structures. The work will be commenced as soon as the property is vacated by some parties now on a portion of it, on the 1st July, 1870. In the meanwhile the company of gentlemen, after having had before them plans and drawings from a number of prominent architects, have adopted the plans submitted by Mr. H. G. Harrison, and the designs are certainly very grand and imposing, and admirably adapted for the purposes intended.

Too much praise cannot be extended to the gentlemen who have inaugurated this movement, which is certain to prove a financial success. The good judgment they have displayed in the selection of their designs, so well adapted to meet the purposes and wants of a large body of people, gives a guarantee of the support and encouragement which will be given them, and at the same time gives to our city an ornament as well as a long needed improvement.

The whole outlay will be in the neighborhood of \$1,000,000. It is not too much to claim for this building an extent greater than any other of a similar character. On its ample floor an entire army corps could be paraded, and room

left for 20,000 spectators besides. The vastness of the space might be realized by any one who has been within the Coliseum of Boston, and being told that this market is to exceed that structure by 10,000 feet. The space of an ordinary block is something of vast and striking effect when built on, but this is what people popularly know, as an avenue block, which has a rectangular stretch four times as great and correspondingly imposing.

Agreeably to invitation, representatives of the press in this city assembled at the office of the Manhattan Building Company, when the plans of this great structure were submitted to their examination by the trustees of that institution, and much of the information given above furnished respecting the purpose of the association.—*New York Herald.*

STATISTICS OF THE GLOBE.

THERE are on the globe 1,288,000,000 souls, of which:

360,000,000 are of the Caucassian race.

552,000,000 are of the Mongol race.

190,000,000 are of the Ethiopian race.

176,000,000 are of the Malay race.

1,000,000 are of the Indo-American race.

There are 3,642 languages spoken, and 1,000 different religions.

The yearly mortality of the globe is 33,333,333 persons. This is at the rate of 91,554 per day, 3,730 per hour, 62 per minute. So each pulsation of the heart marks the decease of some human creature.

The average of human life is thirty-three years.

One-fourth of the population die at or before the age of 7 years.

One-half at or before 17 years.

Among 10,000 persons, one arrives at the age of 100 years, one in 500 attains the age of 90, and one in 100 to the age of 60.

Married men live longer than single ones.

In 1,000 persons 95 marry, and more marriages occur in June and December than in any other months in the year.

One-eighth of the whole population is military.

Professions exercise a great influence on longevity. In 1,000 individuals who arrive at the age of seventy years, forty-three are priests, orators or public speakers; forty are agriculturists, thirty-three are workmen, thirty-two are soldiers or military employees, twenty-nine advocates or engineers, twenty-seven professors, and twenty-four doctors.

Those who devote their lives to the prolongation of that of others die the soonest.

There are 336,000,000 Christians.

There are 5,000,000 Israelites.

There are 60,000,000 Asiatic religionists.

There are 190,000,000 Mohammedans.

There are 300,000,000 Pagans.

In the Christian Churches—

170,000,000 profess the Roman Catholic.

75,000 profess the Greek faith.

80,000,000 profess the Protestant.

M. REINSCH, having experimented with various salts in order to determine which was best suited to prevent timber bursting into flame has come to the conclusion that impregnating timber with a strong solution of rock salt is as good (if not a better) preservative against its bursting into flames, as water-glass (silicate of soda). Rock salt costs much less than water-glass, and it has also the effect of keeping the timber free from dry-rot and noxious insects. He also says that the use of a solution of salt in extinguishing a fire with fire-engines would be very effective, but it is questionable whether the engines would not soon become worthless from the effect of the salt.

TIMBER.—THE EUROPEAN LARCH.

FROM observations of the varieties of trees most in demand for new plantations in this State and Iowa, as well as from conversations with men who are best informed on the subject, I am led to believe that the value of the European Larch as a timber tree is very far from being appreciated as it should be; and believing that the diffusion of a more general knowledge of its valuable properties may lead to its more extensive planting, I am induced to offer some remarks upon its nature, and the properties which render it peculiarly adapted to the wants of a prairie country. The wood of the larch is very close grained and compact, of a reddish or gray color, and remarkable for its weight, and its great strength and durability. In the latter quality it is superior to the oak, and in old vessels the timbers of the larch have been found perfectly sound, when those of the white oak were completely decayed. Its great hardness makes it valuable for use in exposed situations, where it is subjected to wear or pressure, as in steps, or railroad-sleepers; and its compactness renders it nearly incombustible, except when splintered. In all these qualities the European larch is superior to the American, which is commonly known as the *Shackmataë*. On the continent of Europe the wood of the larch is put to a great variety of uses. Casks are made of it, nearly incorruptible; water pipes, shingles, vine props, etc. Its excellent properties for shipbuilding are its durability; its little liability to shrink or crack; its toughness; its beautiful color and capability to receive polish, and its incorruptibility when exposed to alternations of moisture and dryness.

Probably the most successful illustration on record, of the combination of a profitable private enterprise, with a great national benefit, is afforded in the

history of the plantations of larch which were made by the Dukes of Athol, on tracts of barren mountain land, utterly worthless for ordinary culture, in the north of Scotland. These plantations were begun as an experiment, between 1740 and 1750, and, after satisfactory proof of the hardihood of the tree, and its capacity for growth on a poor soil, and in the rigorous climate of mountain heights, in latitude fifty-nine degrees north, the plan was followed up, by the Duke and his successors, until 1826—no less than ten thousand acres of previously worthless land was covered with the larch. The trees were planted thickly at first, and thinned out as occasion required, till they attained such sizes that they could be left to themselves.

At twenty years they attained sufficient size to be available for a great variety of uses, and at seventy years they were fit for timber for the largest ships, and the value of the standing timber on 6,500 acres, which sustained an average of 400 trees to the acre, estimated at half its price at the ship-yards, was £1,000 per acre, or in all, £6,500,000—equal to \$32,500,000.

At the nursery of D. E. Scofield, at Elgin, in this State, may be seen extensive avenues of the European larch, now fifteen years old, an inspection of which will satisfy any one of its value as a timber tree for the prairies. These trees will average thirty feet in height, and eight inches in diameter at the butt, the timber perfectly sound, and the trees presenting a uniform appearance of vigorous, healthy growth. If we reflect upon the value which might be given to great tracts of prairie land, by plantations of a tree so admirably adapted to supply the immense future demand for timber possessing such qualities as the larch, no further argument will be

needed in proof of the wisdom of acting upon the suggestion in every available case by individuals or companies. Every owner of prairie land can decide for himself as to the expediency of making such use of any portion of his estate; but there is one aspect of the question of future demand which renders the subject worthy of consideration on a larger scale than would be likely to be attempted by any individual proprietor. I allude to the necessity, which must exist in all future time, for railroad sleepers. These are now worth fifty cents each. In view of the needs of railroads yet to be constructed, the present sources of supply are certainly insufficient to admit the possibility of any reduction of price. Twenty-seven hundred sleepers per mile, at this rate, is \$1,350; and for a thousand miles is \$1,350,000. And this enormous outlay must be repeated every seven or eight years. It will be seen, therefore, that the subject of providing for this certain want assumes a magnitude which makes it of national importance. In twenty years from the time of planting each tree would furnish one, and probably two sleepers; in twenty-five years certainly every tree would furnish two. Twenty-five years is a trifling period in the life of a railroad. The details of planting and culture, for the few years that any culture is required, are simple, and can be easily furnished when needed. In view of these facts, and without taking into account any of the other uses to which the timber might be applied, I respectfully submit to the managers of the present and future Western railroads the expediency of establishing nurseries and plantations of the European larch in such positions as will be readily available for future use. By the time they attain the age of fifteen years they will require thinning, so as to leave about four hundred trees to the acre, and these thinnings will furnish valuable timber for many useful purposes. At twenty years one-half of the four

hundred might be removed, every one of which would furnish at least one good sleeper; and five years later every one of the two hundred which were left would furnish two. Is not the question of this collecting tribute from the alternate sections belonging to the Pacific Railroad, which must otherwise remain comparatively valueless for a long time to come, one which is well worthy of consideration.

H. W. S. CLEVELAND,
115 Madison Street.

Chicago, Nov. 22, 1869.

VALLEY FORGE.—A correspondent writes: The house which Washington made his headquarters at Valley Forge, on the Schuylkill, has, from every appearance, had the greatest care taken of it, and is now in excellent repair. Little change has been made in it since the terrible days of the Revolution. It is a rock house, consisting of two rooms below and two above, having a narrow hall. (Some one-story rooms have been added.) The style of the window sash and woodwork generally shows its great antiquity. The inside is painted white. The rooms are neatly papered, and everything appears tidy and attractive. The old entrenchments have also withstood the rugged hand of time, being almost perfect in some places. This may be accounted for in some respects by the nature of the ground. There is a great deal of rock mixed with the thrown-up dirt. Part of the entrenchments extend through wooden country. The forts are still elevated above the common level, and, unless moved by the hand of man, will remain there for centuries to come. There are five cannon balls at the headquarters. Here the American army endured sad want from hunger, and here its great commander bowed his head in prayer.

AN ARMY OF MONKEYS.—A NOVEL BRIDGE.

"THEY are coming, and will most likely cross the river by the rocks yonder," observed Raoul.

"How, swim in?" I asked. "It is a torrent there."

"Oh no," answered the Frenchman; "monkeys would rather go into fire than water. If they cannot leap the stream, they will bridge it."

"Bridge it! and how?"

"Stop a moment and you shall see, captain." The half human voices now sounded near, and we could perceive that they were approaching the spot where we lay. Presently they appeared upon the opposite bank, headed by an old gray chieftain, and officered like so many soldiers. They were, as Raoul stated, of the coma-dreja, or ring-tailed tribe.

One—an aid-de-camp or chief pioneer perhaps—ran out upon a projecting rock, and after looking across the stream, as if calculating the distance, scampered back, and appeared to communicate with the leader. This produced a movement among the troops. Commands were issued, fatigue parties were detailed and marched to the front. Meanwhile several of the coma-drejas—engineers, no doubt—ran along the bank, examining the trees on both sides.

At length they all collected around a tall cottonwood that grew over the narrowest part of the stream, and twenty or thirty of them scampered up its trunk. On reaching a high point, the foremost—a strong fellow—ran out upon a limb, and, taking several turns of his tail around it, slipped off, and hung head downwards. The next on the limb, also a stout one, climbed down the body of the first, and whipping his tail tightly around the neck and forearm of the latter, dropped off in his turn, and hung head down. The third repeated the manœuvre upon the second,

and so on, until the last in the string rested his forepaws upon the ground.

The living chain now commenced swinging backward and forward like the pendulum of a clock. The motion was slight at first, but gradually increased, the lowermost striking his hands violently on the earth as he passed the tangent of the oscillating curve. Several others upon the limbs above aided the movement. This continued until the monkey at the end of the chain was thrown among the branches of a tree on the opposite bank. Here after two or three vibrations, he clutched a limb and held fast. This movement was executed adroitly, just the culminating point of the oscillation, in order to save the intermediate links from the violence of a too sudden jerk.

The chain was now fast at both ends, forming a complete suspension bridge over which the whole troop, to the number of four or five hundred, passed with the rapidity of thought.

It was one of the most comical sights I ever beheld, to witness the quizzical expression of the countenance along that living chain.

The troop was now on the other side, but how were the animals forming the bridge to get themselves over? This was the question that suggested itself. Manifestly by number one letting go his tail. But then the *point d'appui* on the other side was much lower down, and number one, with half a dozen of his neighbors, would be dashed against the opposite bank, or soused into the water.

Here, then, was a problem, and we waited with some curiosity for its solution. It was soon solved. A monkey was now seen attaching his tail to the lowest on the bridge, another girded him in a similar manner, and so on, until a dozen more were added to the string. These last were all powerful

fellows; and, running up to a high limb, they lifted the bridge into a position almost horizontal.

Then a scream from the last monkey of the new formation warned the tail end that all was ready; and the next moment the whole chain was swung over, and landed on the opposite bank. The lowermost link now dropped off like a melting candle, while the higher ones leaped to the branches, and came down by the trunk. The whole troop then scampered off to the chaparal, and disappeared.—*Adventures in Mexico, by Lieut. Reid.*

WINDOW GARDENING.

NOTHING adds more to the beauty or attraction of a room, than the presence of flowers in the windows, whether in bouquets or growing in pots. We have seen plain little sitting-rooms made absolutely beautiful by means of a few choice flowers in pots in the windows.

A few hints is all that is essential to enable any person to rear the most beautiful flowers. Inexperienced persons should begin with a few plants of easy culture, such as hyacinths, roses, petunias, geraniums, fucias, and the "cigar-plant,"—*Cuphæa platycentra*. The latter is a lovely little plant, about six inches in height. The flowers are white, scarlet, and purplish-black, and the foliage is small and neat. This exquisite little plant often blooms when not more than an inch in height, looking like blossoms stuck in the soil.

The calla-lily (*Richardia Æthiopica*), and Chinese Primrose (*Primula prænitens*), are also plants of easy culture in the house, the former needing no care beyond sufficient moisture with tepid water. The latter is especially adapted for window-gardening, blooming freely from December to May. The colors are red, white, crimson, and their combination of shades.

Any good garden soil will do well for potting in; but it is better enriched with a little cow-stable manure. Set pots in a warm, sunny window, on the south side of the house, if any there be in your cottage, and apply water sparingly or freely, as the species of plant requires, remembering that some plants need a great deal of water to sustain them, while others but very little.

Plants should not be kept too warm during this cold, hard, freezing month, as is often the case with inexperienced florists. Keep the room in as regular a degree of heat as possible, and you will be compensated by a grand addition of domestic beauty and comfort.—*Bee Keepers' Journal.*

MORE WATER FOR BROOKLYN.—The Brooklyn Water Board have finished an examination of several ponds on the south side of Long Island, with a view of obtaining a greater supply of water. The eight reservoirs now constructed can yield but 20,000,000 gallons per day, which was thought, some years ago, when the works were constructed, to be all that would be necessary for the succeeding forty years. The consumption by Brooklyn is now over 17,000,000. The reservoirs now in use are those of Mount Prospect, Ridgewood, Jamaica, Brookfield, Clear, Valley Stream, Rockville, and Hempstead. Besides these the company possess six large mill ponds. They propose, the coming spring, to erect a number more, so that the complaints of scarcity of water will be no longer heard.

A GRINDSTONE should not be exposed to the weather, as it not only injures the woodwork, but the sun's rays harden the stone so much, as to render it useless in a very short time.

CINCINNATI is to have a new Merchants' Exchange to cost \$400,000.

“EVERYDAY LIFE IN-DOORS.”

[FROM THE KANSAS FARMER.]

OUR new house is done at last. After seven years of anxious waiting and watching, we have just got cleverly settled. To be sure, the new house is not a palace, but it is a place of contentment. Husband paid more attention to comfort and convenience than to show. Our house faces toward sunrise, with portico in front and a hall through the centre. On the south side of the hall, in front, is the parlor with the spare bedroom and wardrobe in the rear; doors from both opening into the parlor. On the north side of the hall is the family sitting-room, with *our* bedroom in the rear; also, a bedroom for the hired girl and the two smallest children. The dining-room is separated from the hall by a transverse hall, at the south end of which are the two inside stair-cases, one leading to the two rooms upstairs, and, under that, another going into the cellar. The dining-room is provided with a fireplace, and the building of this left a niche five feet wide and twenty inches deep, which husband converted into a dresser, which is, I assure you, very convenient. South of the chimney is the door leading into the kitchen. The latter is provided with a cistern pump, which comes up in a sink, with a waste-pipe leading (under ground) down back of the stable into some kind of a vat husband is building. We also have a fireplace in the kitchen, with a crane, which is very nice to heat wash water at times when the stove is otherwise employed. Husband likes a roast chicken, and turkey too, and that can only be *well* done before an open fire. A loaf of rye-and-indian bread, too, tastes better baked in an old-fashioned skillet. Under the sink we have a little cupboard for the iron vessels.

Husband thought that, as the farm had paid pretty well this year, we ought

to have a new cook stove. He sent me to make the selection, and I confess I was somewhat puzzled. There were twelve different varieties. We had tried the “Cook’s Favorite,” but I was not altogether satisfied with it. After much deliberation, I took a “Charter Oak,” No. 7. The vessels that generally come with cook stoves are too small. I took special pains to order large ones. I had bought two tin wash-boilers with our other stove, but they don’t last; so, this time I took a copper boiler, although I had to pay four dollars more for it than I would for the tin boiler, and I am satisfied it is the cheapest. Husband was particular to have the kitchen very large. It is eighteen by twenty. There are times in winter when it is convenient to eat breakfast there. The wood-house is under the same roof with the kitchen, with a door opening into it. This gives us a lumber-room over the wood-house: a cool, pleasant place for the children to play, a convenient place for carpet rags and old clothes, the barrel of salt, and other things, as the auction bills say, “too tedious to mention.”

I took the carpet from our old parlor, and put it on the new sitting-room. The sitting-room carpet of the old house was considerably worn, but by taking out one width, it answers very well for the kitchen. I keep some strips of oil-cloth around the stove, to save grease spots, which will occur with the best management. The oil-cloth is easily washed, and it leaves no perceptible stain upon it. An accidental coal, falling from the stove, is not apt to do any damage by falling on an oil-cloth.

Husband and I debated the subject of parlor and bedroom carpets. We soon agreed about the parlor and spare bedroom; they should, of course, match, and we decided upon a “three-ply, all

wool," of rather dark pattern. John thought we had better get hemp carpets for the other bedrooms, because it was cheaper than rag carpet, and looked full as well. I knew if hemp carpet lasted anywhere, it would be upon the bedroom floors; but I did not believe it would *pay there*; so I told John to get a hemp carpet for the children's bedroom, and one for the hired men's bedroom upstairs, and I would get the carpets for our bedroom and the other one upstairs. I had enough rags cut (I always cut them as fast as a garment wears out) to make both carpets; so I sent that day and got the "chain," and took both the rags and chain to the Widow Chapman, and hired her to do the coloring, warping and weaving. I could have done the coloring; but the widow needs help, and will not accept it except in the shape of work. John bought the hemp carpet—got it at forty-five cents a yard. Forty-three yards would come to nineteen dollars and thirty-five cents. I'm afraid John won't be satisfied with his purchase six months from now, but I may be mistaken.

Our hired men are getting in a nice lot of wood. It was cut last fall, and is well seasoned. I do like good wood to cook with. I can get the breakfast in half the time that I can with indifferent wood; and then bad wood tries one's patience so. John is at work in the wood-house, piling the dry cottonwood, for kindling, all by itself.

I tried the baking qualities of the new stove to-day, and I think it rather overdone the thing; but, as a new broom sweeps clean, I see no reason why a new stove should not *bake fast*. The truth of the matter was, that my bread scorched outside before it baked through. I think the cause of it was, that the "sut" had not formed sufficiently on the plates to neutralize the heat. The dampers seem to work to perfection.

It is the little things of this life that annoy a body; and one that annoys me (I'm ashamed to confess it) is no larger

than the "swill-pail." It is a "necessary nuisance," always needed, yet always in the way—an unsightly object to man or womankind.

John acted in this, as in everything else, very clever with me. He built a box, just large enough for the pail to sit in, and covered with a lid, on leathern hinges, and set this box in one corner of the wood-house, just by the kitchen door.

Our hired girl, Mary washed to-day, and she says that "Universal Wringer" is a *convaynient* thing. I think so myself. John got me this one; and when he brought it home, the first thought that struck me was, that it would not stand in hot water. It may not, but I have used mine for a year now, and can see no change in it so far as the rollers are concerned. I think likely that it turns a little harder now than it did at the start. I am not mechanic enough to tell the reason, but I thought it was occasioned by the swelling of the wood, which throws the cogs too deep in gear. Nevertheless a woman has no more business doing without one than she has without a cook stove.

I have been removing some of my flower pots and dahlia roots to the cellar. We will be somewhat crowded for room in the cellar this winter; but John will build a cellar under the granary, next summer, so that we will have more room hereafter.

John has just finished setting some posts for my clothes-line; and on one of them he put a little box, with a windlass, so that we save some cold fingers in taking down and putting up the line. Our milk cellar is small, and has not enough ventilation. My cream gets bitter, before it is sour enough to churn, consequently I have to keep my milk in the spring-house. This I don't like, from two causes: first, a sudden and heavy rain raises the water, so that if the milk or cream is sitting in the box, I lose it; second, if I use tin milk-pans, they rust out very fast, and milk in crocks is unhandy to skim.

I tried my stove on a piece of roast beef to-day, and I must say I am pleased with it. It suits me very well to have a large roast on Saturday. Sliced cold, with mashed potatoes, it gives you a Sunday dinner with very little trouble. John likes a few sprigs of celery in his roast; and celery, he says, must accompany roast beef in winter always. I think it very nice myself. A six-pound roast ought to be cooked in about ninety minutes; a thickened dressing, to baste it with, adds to its flavor. The ashes from a fireplace are troublesome, unless one is well fixed to take care of them. We have to save all of our hard wood ashes, in the country, or else do without good soap. John built a brick smoke-house, and right in there I keep my ashes. No danger of fire there; and when I want to put them to leaching, I have good, dry ashes, that have not lost their strength with every rain. Good soap is a "desideratum." The wearing out of clothes is often due more to bad soap than to any fault of the fabric. Hickory ashes, I think, contain the most potash, and consequently go farther in making soap.

I went with John last night to hear a lecture on "Woman's Rights," by a woman, of course. What a state of degradation she brought all womankind into, to be sure! I thought I had my rights before—and more, too; but seems I have not. Hereafter, I've got to read politics, post myself up on all the reform bills, vote, and I don't know what all. I'm afraid our "*rights*" will become burdensome.

ELECTRICITY as a heating medium has, it is asserted, been successfully tried at the Hotel Dieu Hospital, in Paris, and it is reported that hereafter the other large hospitals of that city will be warmed by means of the electrical apparatus instead of by coal.

A BITUMINOUS composition, which may be used in the shape of bricks or as a coating on any desired foundation, has been invented, and is said to be suitable for the bottoms of reservoirs, for pavements of streets and terraces, and many other applications. It is composed of the following ingredients in the proportions stated: For every 100 pounds weight of bitumen—sulphur, 37½ lbs.; galipot (or in case of necessity colophony), 25 lbs.; lamb-black, 12½ lbs.; sand, 25 lbs.—100 lbs. For bitumen to be applied on wood the quantity of sand may be reduced by about 5 lbs. weight, and it is preferable that the wood be rough. In preparing this bitumen the sulphur must first be thoroughly melted in a sheet iron caldron or in an earthenware pot; the galipot is then added, and when this is almost entirely melted the lampblack is introduced, and, lastly, the sand. The whole is carefully mixed over a moderate fire.

THE JEWS IN PALESTINE.—A correspondent of the *Church Times*, London, gives an affecting account of the condition of the Jews in Jerusalem, about eight thousand in number. They are mostly settlers from Europe and their descendants, with very few of the old, indigenous stock; and they live mostly on alms of European societies, so that they are in fact a mass of degraded paupers, content to live on a scanty dole rather than labor for their bread. Schemes have been tried to encourage them to cultivate the soil by obtaining grants of land for them, but the idleness of the Jews themselves has hitherto frustrated this praiseworthy attempt. Sir Moses Montefiore was instrumental in building for them schools and houses, and a mill outside of the city near Birket-es-Sultan, or Lower Pool of Gihon; but his charitable efforts have been apparently wasted.

A PRE-HISTORICAL POMPEII.

UNDER this title the *Revue des Deux-Mondes* has published an article by M. F. Fouque on some under-ground villages discovered in the small island of Therasia, adjoining Santorin, of volcanic notoriety, in the Greek Archipelago. The writer affirms that we have here a distinct proof, not only that the human race may be traced to the quaternary period, but that even then it had made some advance in civilization. It appears that these primitive villages were destroyed by the same volcanic agency as Herculaneum, Pompeii, and Stabii. The houses were built in the open air, on the old soil, and were afterwards buried under a stratum of pumice-stone and tufa, ejected from a crater. The inhabitants were taken by surprise in the midst of their daily avocations, and their tools, vases, and domestic utensils have remained for thousands of years on the spot they occupied at the time. At Santorin and Therasia the strata of tufaceous pumice have been worked from time immemorial as building material, and a good deal of it has been exported to the Suez Canal. Yet the habitations now brought to light under M. Fouque's direction are constructed quite differently; they consist of large blocks of lava, heaped one upon the other, without any order, the interstices being filled not with any kind of mortar or cement, but with reddish volcanic ashes, having no cohesion whatever. The only house hitherto entirely exhumed is composed of six rooms, the largest of which is eighteen feet by five, and the smallest about eight feet square. One of the main walls of the building incloses a court. Three windows and one door have been recognized, a circumstance which shows that this was a dwelling house and not a tomb. The ceiling was composed of a series of wooden cross-beams, on which stones

and a thick layer of volcanic earth were spread. Among the objects found inside there was the skeleton of a man, besides flint implements, earthen vases manufactured on a turning wheel, and containing various seeds, such as barley, peas, cardamon, etc. Most of the vases are of the capacity of twenty gallons and more. Two slabs of lava were used for grinding corn; but the most curious relics were certain stone disks with a hole through the middle, and which are still used in the country by weavers to stretch the threads of the warp with; whence it may be inferred that the textile art existed many thousand years ago, and must have been nearly coeval with the creation of man.

AT Paris a curious discovery has recently been made in the ancient church of St. Gervais. In repairing the wainscoting of one of the side chapels on the left of the nave, the workmen detected a small secret door that led into an inner chapel or chamber, the existence of which seems to have been entirely unknown. The walls of the chamber were found to be entirely covered with excellent paintings of the Renaissance period, in thorough preservation and of real interest. Few churches in Paris are richer in artistic relics than St. Gervais, which contains a fine picture of Albert Durer, and a remarkable copy of Raffaele's master, "Perugino."

THE Chicago people talk about building another tunnel under their river, at a cost of half a million dollars. It is to be constructed so as to accommodate pedestrian and vehicle travel.

PARLOR PLANTS.

AMONG hundreds of plants that crowd the green-house there are comparatively few which can be grown to advantage in the parlor. Yet parlor, or window gardening is certainly the most popular of horticultural operations, because it is that which is adapted to the capabilities of the many, and not that which can only be indulged in by the few who can command the necessarily larger means which the construction and care of green-houses require. A plant which will grow, flourish and bloom in the window, which will thrive with little care, and repay that care with healthy foliage and cheerful bloom, is of far greater value than one which will only do well under green-house treatment. Such a plant will always be popular. It may, in time, be scorned by florists, because it is old and common, but the very fact of its recommending itself to the masses, is that which will ensure its continued cultivation long after a large proportion of costly novelties have in turn given place to newer discoveries, and been cast aside into not unmerited oblivion. Many plants which we seldom see in green-houses, succeed perfectly in the parlor; and, stranger still, many plants which we commonly see grown in windows never do well under such culture, and utterly refuse to be reconciled to it.

Plants in rooms generally suffer from dust, by which the leaves become clogged, or the vital functions of the plant impaired. To remedy this, it is only necessary to sponge or syringe the plant as often at least, as once a week. The syringing or sponging can easily be done in the kitchen sink, the pot being laid on its side, and both sides of the leaves thoroughly wet. A common small water pot with fine nose will answer every purpose. Sponging, which is better for plants with hard, glossy

foliage, should be done with a soft sponge or a bit of flannel. In every case where water is applied to a plant, either at roots or branches, it should be of the temperature of the room where the plant grows. Rain water is preferable to any other, and where hard water only can be obtained, it should be allowed to stand some hours before being applied to the plants. In sponging plants that are very dusty, lukewarm water may be used to advantage. But after the operation, a good showering of colder water should be given. The soil used should be much the same for all window plants, and may be generally described as good garden loam.—*E. S. Rand, Jr., in Journal of Horticulture.*

THERE have been twenty-five hundred new buildings erected in Chicago during the past year, at an expense of ten million dollars.

THE appraisers have fixed \$36,000 as A. T. Stewart's annual rent for the ground on which his down-town dry goods palace stands in New York.

A MODEL of the proposed bridge across the British Channel is to be erected over the lake in the Bois de Boulogne. In constructing the channel bridge, the piers are to be floated to the appointed spot, and then, the buoys being withdrawn, they fall into their position. Each pier is armed with telescopic screws of enormous strength which are worked into the bed. The piers are so constructed that water pours through them with little resistance; and each pier is provided with a staircase, up which, should vessels run foul of them, the crew could run and go home by train.

THE DUTY OF THE INSURED AT A FIRE.

ALITIGATION in the Superior Court, in Cincinnati, has recently resulted in affirming the judgment of a lower Court against a fire insurance company for the amount of a disputed claim. The company set up as their principal defence the violation of a provision inserted in the policy which they issued, to the effect that the best endeavors of the owner should be used at and after a fire to save the property insured. It appeared that the owner employed a person to take charge of the goods, who resided in the building where they were stored; that when the fire first began, and could have been readily extinguished, this person refused to have the doors opened; that time was lost in breaking into the building, and that the chief loss was occasioned by this delay.

There is a similar clause in most fire insurance policies. When the owner of insured property is present during a fire, he may have this dilemma before him: whether to endeavor to remove his property to some other place where it may be injured or stolen, or where it may burn up, and where it certainly is not insured, or whether he shall let it alone and give the Company an opportunity to deny liability because he has not exerted himself. If the choice of such alternatives may prove embarrassing to an owner, what must they be to an agent?

The Court considered that the person in charge of the property may have thought his own conduct judicious—the fire might be increased by opening the door, and opportunity be afforded for pillage; that an honest mistake furnished no ground for blame; and that the acts of the agent were constructively those of the owner. There can be no question as to the wisdom of this judgment. And fire insurance companies will find it unprofitable to seek to escape liability, where no fraud

is alleged, by getting behind the numerous provisos that fill their policies. If all these points are to be used to the disadvantage of the unfortunate sufferer by fire, the value of insurance is, in the Dickens' phrase, on the whole "infinitesimal."—*New York Times*.

THE MORMON TABERNACLE.

IT deserves the name of wonderful. Its like does not exist in our land, if anywhere. It is an edifice two hundred and fifty feet long inside, and one hundred and fifty feet wide. Brick columns or walls about twelve feet high, four feet thick, and some twelve feet deep, placed around the entire circumference, at intervals of about ten feet, support the walls and roof, and give free entrance and exit through wide doors on the inner side directly to the ground floor, upon which level is the great audience chamber, capable of comfortably seating fifteen thousand persons. The roof is like a monstrous half egg-shell cut through its longer diameter. It is supported on arched trusses and coned with pine, and no supporting columns break its great expanse. Its height is over sixty feet. The pulpit occupies one end, and an organ higher than the Boston monster, almost as broad and musically excellent, is in process of construction, and nearly completed, back of the pulpit. The whole interior, pulpit and all, is white pine. The long benches are curved in seat and back in a way to make them, though uncushioned, more comfortable than those in most modern churches. At intervals curtains of thick white canvas are looped up across the ceiling, ready to let down to decrease the size of the room when small audiences are present. Here Brigham and his Bishops preach Sunday afternoons, and while there are services in the morning, the chief attendance is at the ward churches, where the Elders conduct the services.

A FINE ART COLLECTION.

THE largest collection of pictures, probably ever made in America, in variety of painting and number of artists, is shortly to be transferred from Boston to New York. They were the property of the late Mr. Thos. Thompson, an exceedingly eccentric person, who lived quietly in Boston until about ten years ago, when some conduct of the assessors in daring to touch his property, and to lay a greater tax upon it than he thought it was liable to, excited his wrath, and he shook the dust from his feet against the city, never entering it again. The paintings remained there. Very few persons would consent to visit them; they were stacked high against the walls, covered with cobwebs, and most of them have never been seen but by himself and the painters.

The collection is now being catalogued by Mr. J. Harvey Young, the portrait painter, and it is stated that the bulk is so great that ten railroad cars will be required to receive the canvasses without boxing or any intermediate packing. Bierstadt asserts that the collection is worth at least half a million. American artists are largely represented, and there are many paintings of the Flemish school. From Europe many originals and copies of old masters, such as Titian, Rembrandt, Rubens, and others, were obtained, and if the purchaser was deceived in these, he was simply like many other American collectors.

WHITMAN RAILWAY CAR STOVE. — The Whitman Car Stove Manufacturing Company, of Portland, Maine, have recently begun the manufacture of the Whitman Stove, specially designed for use in railway cars, and which promises to obviate all the dangers which have hitherto attended the heating of cars. The fire-box is made of wrought iron, so strongly put together that it cannot be

broken, and surrounded by an outer cylinder of Russia iron, which prevents scorching. But the chief and most important peculiarity of the stove is an ingenious arrangement for instantly closing the draft and funnel apertures, when the stove is thrown out of position. This is effected by the law of gravitation, acting on a very simple mechanical device which cannot fail to operate. The stove door is locked, the key remaining in possession of the brakeman. These stoves have been introduced on the Portland and Kennebec Railroad, and as their merits become known will no doubt be generally adopted. If they will perform what is claimed for them, and there seems to be no reason to doubt it, as a measure of humanity every railroad in the country should be supplied with them.—*Boston Commercial Bulletin*.

THE Fifth avenue, New York, is to be laid with asphalte similar to the streets in Paris.

THE windows of Mr. A. T. Stewart's palatial residence, New York, are made to slide into the wall, and are each one sheet of French plate glass.

MEMORIZING.—It is a remark of Bacon's that if we wish to commit anything to memory, we will accomplish more in ten readings, if at each perusal we make the attempt to repeat it from memory, referring to the book only when memory fails, than we would by a hundred readings in the ordinary way, and without any intervening trials. The explanation of this fact is that at each effort to recall the passage secures to the subsequent perusal a more intense degree of attention; and it seems to be a law of our nature, that there is no memory without attention.

CORRESPONDENCE.

It must be distinctly understood that we do not hold ourselves accountable for the opinions of correspondents.

Baltimore, Md., Dec. 14th, 1869.

EDITOR OF THE ARCHITECTURAL REVIEW
AND BUILDERS' JOURNAL, PHILADELPHIA, PA.

DEAR SIR:—An article in a recent number of the "*London Builder*" discussing the question "as to whether *broken stone*, when made into concrete, diminished in volume or not," seemed to me to show such entire ignorance of the fundamental principles to be kept in view in the formation of concrete, that I have thought a few items on the general subject might not be uninteresting to some of your readers.

The experiences of the London Builders presented in the same article, in favor of the shrinkage of *broken stone*, really only determines the fact, that the whole mass of concrete occupies a less cubic space, than the united cubic contents of its separate ingredients; a result which should undoubtedly obtain in all cases where anything like the proper proportions have been observed.

The object sought to be obtained (as usually understood) in the preparation of a mass of concrete is, *theoretically*, to fill the *void* spaces in a mass of broken stone with some material that will firmly unite the pieces together. In practice, it has been found that a much less quantity of the cementing material is required to unite the whole together firmly than the volume of the *void space* in broken stone—so that a portion of this space is filled with sand and gravel, but still *theoretically*—the volume of the mass united, is only that of the broken stone alone—practically, to insure contact of the mortar with each particle of the ingredients, and to provide against careless manipulation, waste, and the shrinkage of cement and sand,

made into mortar, and excess of from fifteen to twenty per cent. of sand and cement is usually added:—the ordinary proportions now used on the best works, being 1 part cement, $1\frac{3}{4}$ sand, $1\frac{3}{4}$ gravel, 4 parts broken stone, which will occupy about 5 parts when set.

The cost of concrete may be reduced, and its manipulation improved without injury to its strength or energy, by mixing with the cement about three-fourths of its volume of pure lime. In making hydraulic mortar for masonry, it will always be found advantageous to use one-half to three-fourths of a volume of lime, to one volume of cement; it does not injure the mortar as to its hydraulicity or strength, and insures its arrival at the mason's hands, free from the "*incipient set*," which injures its character materially with our native cements.

In preparing cements, the sand and cement should first be mixed to form a thin mortar—the gravel should then be added and thoroughly incorporated—and lastly, the broken stone—none of which should be larger than to pass through a two and a half inch ring. In constructing foundations and very heavy walls, large pieces of stone may be placed in the trenches, and the concrete poured in about them. It was formerly considered indispensable to throw the concrete into its place from a considerable height, but an examination of old work has demonstrated the fact to be, that this process disintegrates the mass, and undoes all the results of previous careful incorporation.

It is usual now to dump it into place in layers of not over six inches height from a gangway, not elevated more than a foot or two above the intended place of deposit—it is then

rammed until it shows a semi-fluid, incoherent mass.

The facility with which concrete is made and applied, the small amount of skilled labor required, and its undoubted strength and durability, recommend its much more frequent use in building operations than has heretofore been the custom in this country. In constructing foundations with sloping sides, I have found the use of frames of two-inch plank, battened together in sections of twelve feet length, simple and effective—the bottom edges are held in position by the angle between bottom and sides of trenches—and the tops are maintained in the proper positions by cross pieces of scantling, every four feet having movable trenails passing through them. A very simple and effective apparatus has been invented for building walls of any size and shape, with interior and exterior mouldings and ornamentations, worked in the concrete, as the walls go up—more minute explanations of which would trespass too far on your space. I have not sought to present to your readers any startling or novel discoveries in the “art of building,” only to call their attention to a few well-known facts among those familiar with the use of concrete, in the hope that it may induce a more extended and correct practice in the use of this material.

Respectfully, etc.,

A. H. HUTTON. .

HINT TO PLASTERERS OF HOUSES.

MR. EDITOR:—It is well known that common salt is *deliquescent*, that is, it attracts moisture from the atmosphere. This may be shown by exposing some salt in a paper for some days to the air, when it will be seen that in damp weather, the salt becomes wet; and the weather changing to dry, the salt gives up this excessive moisture, and becomes dry. It is a very delicate indicator of the hygrometric condition of the atmosphere; that is, of its condition as

regards moisture and dryness. The application of this fact is, that sand is frequently brought to the city, which has been collected from off the banks down the Delaware, sand which has been washed by sea water, and hence containing salt. Now this sand, if used in making plaster for the interiors of houses, in consequence of the salt which it contains, inevitably causes damp walls; and this dampness is irremediable, until the plaster is removed, and the building replastered with mortar made with proper sand. This salt sand is a frequent cause of damp walls and damp ceilings. This is essentially different from damp walls caused by *sweating*. This last is a deposit of moisture from the atmosphere on a cold wall caused by a change in the *dew point*. The dew point is the temperature at which moisture begins to deposit from the air, on bodies in contact with it. This is properly the sweating of walls which may generally be prevented by plastering on lath work. When dampness is caused by salt sand used in the plaster, lathing will not prevent this great evil. Water will sometimes run in streams off from such plaster, even when done on lath work, and the only cure is complete removal of the plaster, and its renewal with properly constituted mortar. The sale of this salt sand should, when done through misrepresentation, be punishable by legal fines. Many a fine house has been in this way rendered almost uninhabitable.

PROJECTOR.

EDITOR OF THE ARCHITECTURAL REVIEW.

DEAR SIR:—Having read with attention your remarks on the necessity for the study of the rudiments of architecture in our public schools, I was fully convinced of the advantages to be derived from such a course. The desire of our citizens for foreign travel is now becoming greater; and of all sight-seeing there is none so attractive as that which

the wonders of architecture present. How necessary then is an acquaintance with at least the principles of the great art to enable the mind to form a just judgment on what is presented to the eye.

Writers of travels, and journalistic correspondents abroad are, with few exceptions indeed, sadly deficient in that knowledge which would aid them in conveying to the reader an idea of the monuments they would describe; and readers themselves do not wish to approach the subject, simply because they do not comprehend it, never having learned the simplest elements of architecture.

It requires no lengthened argument to prove the existence of an actual necessity for such a study in our schools, and I sincerely trust that it will soon force itself upon our Boards of Education, and our school teachers generally throughout the land.

L. M. B.

Troy, N. Y., Dec. 1869.

EDITOR OF THE ARCHITECTURAL REVIEW.

DEAR SIR:—I wish to inquire if it is in accordance with the rules of architecture, when pediments are supported on columns, to place the columns directly under the centre of the pediment?

Will you please answer in the next number of your "*Review*," and please make your statement very decided.

Respectfully yours,

SUBSCRIBER.

Des Moines, Iowa, Dec. 2d, 1869.

Very decidedly do we answer, No! The *pediment* may be looked upon in the same light as the *arch*; and nothing would be more absurd than to support an arch at the centre; that is, beneath the key-stone as well as at the springings.

What would be the use of the arch if it required support at the centre? And as the pediment also spans a space, it has as little necessity for central support as the arch. Such a support, even

though it were by columns, as our friend proposes, without actually sustaining the centre of the pediment, would yet *appear* to do so, and consequently give a positive impression of *weakness*. The tympanum of a pediment simply represents the face of the screen which encloses the angular space made by the rafters (represented by the salient cornice) and the tie-beam (which is represented by the horizontal cornice) keeps the rafters from spreading out below, and at the same time spans the covered space. The tympanum is therefore not a representative of *weight* or strength, and might, if thought advisable, be omitted. So that the construction of the pediment is simply that of a strong frame, or girder, which is literally a species of arch, requiring no support from columns or pilasters at the centre. And further, we would say to our correspondent, that as pilasters and attached pediments are but the flat representatives of columns and relieved, or full pediments, the same objection stands good against the intervention of centre pilasters.

EDITOR OF THE ARCHITECTURAL REVIEW.

DEAR SIR:—I have watched with interest the various propositions your article on Awnings has produced, and thus far have seen nothing offered as practical and economical as that we have adopted in our city.

The following is their mode of construction: floor beams are carried from the building entirely across the pavement, where they rest on a girder, supported on columns ranged just back of the curb, the floor beams are given a slight pitch, sufficient to carry off the rain, and are ceiled with matched boards below, covered roughly above, and secured by tin, or any other covering impervious to wet; the girder and ends of the beams are hidden by an ornamental cornice, and surmounted by a railing of tasteful design; the columns, which are from 12 to 18 feet high, are usually

spaced 10 feet between centres, and generally have arches of wood-work sprung between, the spandrils of which are filled in with iron ornaments. Latterly the arch is altogether iron, and has a better effect; the ceiling is invariably painted white, and from its height does not darken the stores, on the contrary, is found from the reflected light to improve them. The columns, cornice, etc., are usually painted of an amber or fawn color, with the ornaments picked out with a lighter shade. We have one entire square of this colonnading, (dubbed portico by the mass,) which is the favorite resort of promenaders, and has added considerably to the rental of the stores. It permits a display of the most expensive goods in the windows, without any fear of Old Sol depreciating their value. In summer it creates a cool and grateful shade, and in winter protects the pavement from sleet and snow, thus making the improvement desirable in both the summer and winter side of business streets.

Enclosed find a photograph of one of the styles, from which you will see that in the hands of an architect they can be made to enhance the appearance of any business street, besides conducing to the comfort of the community who adopts it. Yours,

THOMAS P. KINSEY,

C. and M. Engineer, Reading, Pa.

EDITOR OF THE ARCHITECTURAL REVIEW.

In looking over the early numbers of the present volume of the Review, I find in No. 1, page 57, an error which may lead some of your readers astray. In estimating the capacity of vessels, the writer takes the American standard gallon of 231 cubic inches, and says such a gallon of water weighs 10 pounds; he has confused the imperial gallon of 277.274 cubic inches which does weigh 10 pounds, with our gallon of 231 cubic inches, which weighs but 8.338 pounds.

I would suggest that after obtaining the cubical contents of a vessel in feet,

the number of gallons will be, *almost* exactly, obtained by multiplying by $7\frac{1}{2}$, the number of American gallons in a cubic foot.

WM. G. RHODES.

Philadelphia, Dec. 16th, 1869.

TO THE EDITOR OF REVIEW.

SIR:—Is there any association for the advancement of Architectural science and information in any of our cities? If not, I think there ought to be such. What I mean is, an association or club, such as is common amongst other professions, where a mutual exchange of ideas might be made. There is no doubt that such a thing would be very profitable, and induce many a young man, who now spends his time in useless amusement, to turn his mind to the study of that which he now, too loosely, follows as a mere means of gaining a livelihood.

Yours, respectfully,

R. M.

Boston, Dec. 11th, 1869.

MR. EDITOR:—I am well disposed to compliment you on the merits of your excellent Journal of American Building, but doubt the reception anything looking at all like flattery would meet at your hands. There has been a great want of such a periodical in our country; for, good as undoubtedly the London *Builder* is, it possesses none of that interest for us Americans that a native work would. And while on the subject I would urge the policy of your giving us as little of crumbling antiquity as possible, and in its place as much fresh and instructive matter as is compatible with your plans.

This is a vast country, and its building interests are without limit. Its architectural taste is rapidly improving and extending; so that your field of usefulness demands the most nervous effort on your part, as well as the strenuous support of all of our countrymen who take an interest in art-culture, and feel a pride in the progress of our American cities.

Yours,

PUBLICOLA.

New York, Dec. 7th, 1869.

Q U E R I E S A N D R E S P O N S E S .

L. N. F., Cairo, Ills.—The following is an excellent paint for outside work; ground-glass bottles, scoria from lead works, burnt oyster shells, and the required coloring matter, powdered and intimately mixed with raw linseed oil. This paint requires to be mixed a day or more before use. It is impervious to rats, etc., is weather-proof and exceedingly hard.

S. N., Kansas City, Mo.—We would wish to make the REVIEW less local than it is, and will use every effort to generalize its information: To this end we ask the friendly assistance of our patrons all over the country. Whatever items of building intelligence any one can send us will be acceptable, and aid us greatly in making our journal a standing record of American progress. We particularly desire to have the names of the architects of any new buildings, the description of which may be sent us.

F. W.—We sincerely thank you. The REVIEW is now no experiment; it has succeeded, and we shall seek to improve it in every respect, leaving as little as possible to be wished for by any one.

G., New York.—The more uniform the stratum your foundation rests upon the better. The practice of laying a bed of packed sand is undoubtedly a good one, provided it be very sufficiently and carefully done, and due precaution taken against any possibility of slipping or spreading. Much will depend on the nature of the soil in which the sand stratum is laid.

R. S.—The best form for the plan of a chimney flue is *round*, for the reason that smoke rises *spirally*. But as such a form is somewhat troublesome, the nearer you get to a *square* the better. Nothing is more absurd than our too general *oblong* system.

T. L., Columbus, Ohio.—The bevel-edges of a drawing square should be on opposite sides of the blade, and on the left edge: so that when turning the square over, the edge lies close to the paper.

NEMO.—Send on your ideas in full; we will take care of the spelling and grammar.

G. H., Boston.—There is no such work published as the "*Mirror of Architecture*," though such would undoubtedly give rise to some strange reflections.

BALTIMORE.—We have received, per express, the photograph and plan of churches. They are now in the hands of the engraver, and shall appear in due time. Many thanks.

NOVELTY.—In Russia they use such stoves. Iron has disadvantages that *terra cotta* would overcome, especially in a sanitary sense.

SPECIAL NOTICE.—Owing to the press of professional duties and the extended circulation and demand which has sprung up for the "JOURNAL," in all parts of this wide continent, wherever it has been introduced, the Editor has found it necessary to associate with himself in its publication, Mr. A. W. GOODRICH, who will devote his time and attention exclusively to the business of the REVIEW.

By this means it is believed additional facilities have been made for the prompt accommodation of the public interests, and in future all exchanges and correspondents in reference to advertisements, etc., will please address,

SLOAN & GOODRICH,

152 South 4th Street, Phila.





A. SUBURBAN VILLA.

THE
ARCHITECTURAL REVIEW
AND
BUILDERS' JOURNAL.

A WORD TO OUR BRETHREN.

WHEN the ARCHITECTURAL REVIEW was commenced, an invitation was given to any and every member of the profession to freely make use of its pages for bringing their designs or ideas before the public. A year and a half has past, and during that time but three or four have availed themselves of that invitation. Now, let us look into this matter a little, and see where we stand. The REVIEW has gone on steadily, increasing its usefulness and popularity without the literary or artistic aid of the great body of American architects. Nay, it has successfully stemmed the unprovoked flood of jealous hostility which tried to bear it down, and has outlived the ungenerous predictions of an early death of mere inanition. It is not our purpose in these remarks to glorify ourselves; on the contrary, we desire to avoid the too usually adopted custom of self-laudation, and leave to our readers the unsolicited verdict on the merit or demerit of the REVIEW.

The immense building community of this country certainly required a literary vehicle devoted to their interests; and in no profession is an interchange of ideas more desirable than in that which controls the outlay of such vast capital, and the erection of such wide-spread architectural improvements as are manifest each year throughout the land.

The ARCHITECTURAL REVIEW was started with the intention of meeting the want, and of giving the experienced members of the profession an opportunity to impart, to their younger brethren, that acceptable knowledge which the proper appreciation of their art would render so desirable; as well as affording to the student a ready means of making himself acquainted with the freshest information on the subject of his study.

More than this, the ARCHITECTURAL REVIEW was devoted to the dissemination of information amongst the public at large, and the liberality with which our effort has been sustained by those outside of the building community, is a proof of the desire there existed for such a publication.

Since we have entered on our course others, less devoted to the same subject, yet assuming it, have followed in the track, and indeed the majority of our serials have decked their illustrated pages with something architectural. All this is well, and displays a feeling of interest in the great subject we claim to advocate. Our object, however, was, and is, to devote the REVIEW exclusively to architecture and building on this continent, and to that end its pages shall be dedicated.

To all thinking minds it must be ap.

parent that it is the interest of every architect to bring himself before the public by legitimate means; and here is one so plain, and so effective, that it ought not to require a word of explanation at our hands. Designs are made and handsomely framed, to be hung up in an office as specimens of skill for the inspection of the comparatively few who may visit that office. Now, suppose those designs were reduced to illustrate the pages of the REVIEW, accompanied by suitable description, would they not be infinitely more apt to attain the object they were made for?

It may be that a nervous doubt may exist as to the reception such designs may meet with from the critical amongst

the profession. Well, suppose such is the case, would it not be better to have any positive faults pointed out, before the design is carried into execution. The dreaded criticism would be no more than that which a design must undergo when sent in for competition, and the criticism itself would be instructive to others. If built it will be a lasting mark for criticism.

There is much in this subject well worthy of attention; and we would consider that we had rendered the community and the profession a benefit, could we but induce our brethren to make use of our pages for their own sakes, if not for that of the noble art we emulate each other in endeavoring to advance.

DEGRADATION OF TASTE.

THE free-will license which too palpably prevails in DESIGN at the present day is fraught with dangers to the inexperienced tyro in architecture. As an incompetent pilot steering amongst shoals and quick-sands, has but the friendly breath of fortune to hope for as an aid in his perilous course, so the young architect, commissioned to design a building of some pretention, trusts to luck for that inspiration which should have come of legitimate study. In the past days of Greek and Roman exclusiveness our few but faithful American architects labored assiduously at the tiresome repetition of *echinus*, *ovola*, *scotia* and *ogee*, according to the requirements of their style in which they happened to compose. There was but a very limited field for imagination, and that was confined to the massing of the whole design; but its subsidiary features were, of necessity, uniformly in accordance with the stiff dictates of the style chosen.

The Grecian mouldings being formed on the model of the ellipsis, parabola, and hyperbola, were conducive of pecu-

liar beauty in the dissemination of striking lights, medium or reflective tints of shade, and deep shadows, producing charming effects by blending and by contrast.

The Roman mouldings were designed with a view to the production of effects similar to these, and were so far successful as to give all the sparkle of light and the depth of shadow; but yet there was an absence of that blended beauty for which the Grecian moulding is so conspicuous.

The adoption of the Palladian mode of treating the Roman style was a joyous day to those plodding designers of the severely classic, for, in it they found a relief from the galling rules under which they toiled. But with this welcome light of liberty came a ray of doubtful hue. The very freedom of composition with which they were now endowed had its drawback in the fact of the great difficulty of avoiding *redundancy* in the parts of the mouldings, and thus marring the chief effect looked for.

Were PALLADIO alone to be the master

followed, it might still be well; but the misfortune is that SCAMOZZI, with all his looseness of ideas, has been revived by some of our foreign architects here, and the consequence is that a derangement of thought leads to an infirmity of errors of judgment through the wide door thus laid open to uneducated taste.

Excesses are constantly being committed by some of our busiest architects, and that too in many of our first class residences, especially in New York city. What we allude to particularly is a depraved taste, so very visible in the cornices, large and small, which crowd on and bear down the tortured street front.

Take one of these cornices and compare it with the Grecian of the same order, and the lessons that will be presented to the mind, appreciative of true taste, cannot fail of being productive of good results.

Multiplying the members of a cornice is always in bad taste, because it produces confusion of the whole, and this

may be accounted for in the fact, that the great masters of our noble art devoted their life-time to the study of effect, and were successful to that degree, that the verdicts of centuries of criticism remain unaltered, and are even accepted now by our architects.

For any one, therefore, to presume upon his own judgment, and attempt to set up his taste against the past and the present, there can be but one apology, and that is—*ignorance*.

An adventurous young architect may try his wings in flights of general design, and soar as high as his ambition, and the limits of his estimated outlay, will permit; but let him not go outside of the time honored dictates of taste, as displayed in the composition of the "orders" and their well chosen members. The exercise of free will in this one matter is sure to be subversive of all the rules of design, and must eventuate in that which is most to be feared, by all true lovers of pure architecture—the degradation of taste.

WHAT AN ARCHITECT SHOULD STUDY.

ALTHOUGH the painter, or the sculptor, may exalt himself in his own opinion above the architect, both of those artists are inferior in actual requirement of knowledge to the latter. The painter works out his ideas on canvas, and the sculptor on stone, and each has his work beneath his touch, to retouch or remedy as his taste shall dictate. Not so the architect; his work has to be planned out on paper to a scale, so that the imagination has to struggle with its object; and intense study is absolutely required to secure success in the execution of a design. The painter works out his effects deliberately on a plain surface, and his work is done. The architect has to calculate and design, on his several sheets

of paper, the inside, the outside, and each and every part of his proposed building, and bring all these parts correctly together. He must have a complete command of his subject, and be perfectly prepared to treat it in a masterly manner. A thorough knowledge of optics, perspective, light and shade, and though last, far from least—of acoustics or the science of hearing.

There is also a necessity for an intimacy with the effects of color, and all that the painter is called upon to know in his art, is not less demanded of the architect in his.

Professor BROWN, (a good architectural authority,) in his treatise on "Principles of Designing Public Buildings" says:

"The architect, it must be confessed,

labors under a disadvantage not known to the painter, as he can at pleasure remove mountains, if any such objects in his composition do not exactly please him: not so the architect; after his building is commenced he cannot do this so easily, and when once erected, however some parts may offend his eye, so they must remain, to his utter mortification and disgrace; and, although he may have had a model of the whole edifice before he commenced operations, yet many parts may deceive him, if he has not attended to the laws of optics and perspective, as many of those parts which were seen in the model and added to its beauty, may be entirely lost or disappear from the eye when erected, causing the structure to look distorted and unsightly. Here is the perplexity; and the only assurance the architect can obtain with certainty as to the appearance of his edifice when finished, is by making a perspective drawing of the building from the most conspicuous point of view before he commences its erection.

The study of acoustics, which the painter is not required to have the slightest knowledge of, is one which the architect must thoroughly understand, if he desires to be at perfect ease as to the result of his design. For, what can be a greater failure than the presence of echo, caused by the reverberation of sound arising from the disproportion of a hall or audience room, devoted to public use? Yet, how many of our young architects are apt to run risks in this matter, and neglect the study of those well considered laws which should govern their thoughts when such designs are to be made. How many of our noblest buildings are disgraced by the ignorance of their architect on this subject of acoustics.

It is not an occult science—it is a distinctly elucidated principle which has been laid down centuries ago, and has not been deviated from since. Why then do not all our architects study it?

Optics, too, is a subject with which the earnest architect should be acquainted, and without which it is a very precarious venture in him to undertake the designing of a building of any considerable size. But, ah, how few of our architects read on that subject. How few, how very few, are disposed to look upon it as a requisite study? The neglect of it is, however, so general that we seldom see a finished building which answers the expectations held out by its design upon paper; and we are perfectly confident that the architect himself is dissatisfied with the builded design from which he expected so much when its artistic elegancies were confined to the drawing-board.

There is nothing more fallacious than the appearance which a geometrical drawing of an elevation makes. The visual rays by which we view it are all supposed to be *parallel*. This is a necessity in our art, for, we thus present the drawing, not to the eye of the mechanic so much as to his *rule*. Every measurement can thus be made by him; but all this is sheer deception to the uninitiated observer. A perspective is therefore necessary to show what appearance the building will actually present.

But as such perspective views are usually taken from a chosen point of observation by the draughtsmen, and are most frequently limited to one or two, the bad points are unseen until the building is a "fixed fact," and then, it is as likely as not, the eye-sore will present itself the most prominently of all parts of the composition!

Architects, to avoid this dilemma, have (where the structure is to be a large one,) had recourse, and do so sometimes now, to models made to a uniform scale, but even these do not give to the eye the idea of the building as it will appear when erected. There is a remedy for this, however, to be found in the magnifying-glass, with the aid of which the model might be truly viewed from any

and every point, provided the magnifying power were made equal to the intended size of the building itself. As, for instance, the model being made to a scale of a quarter of an inch to the foot, the magnifying power required would be forty-eight times. Or, if the scale of the model were one-eighth, the glass should have ninety-six times magnifying power. For buildings of moderate size, such as churches, dwellings, etc., the model would prove expensive, and even a number of perspective drawings, from different points of observation would be objectionable, for the same reason.

The client has, therefore, to trust implicitly in the ability of his architect to give him a building which will be, when finished, no subject of regret, no object to be critically sneered at from any point.

A fair knowledge of optics will always guard the architect against such failures, and enable him to calculate to a nicety the actual presentation of desirable features, or the screening or retiring of

those which he does not consider it good taste to exhibit.

In interiors, such as churches, lecture-halls, theatres, demonstration-rooms, and all places where seeing is required to be without any obstruction, and also to be with the least possible strain upon the sight, optics is the study which, together with acoustics, must ever be useful to the architect.

It was the thorough knowledge of these sciences which gave to the architects of St. Peters, at Rome, the wonderful power they displayed in that mighty basilica, whose aisles and accessories are of such exactly just proportions that the eye is deceived and the mind bewildered. In fact, the first view of this vast interior leads to a feeling of disappointment, as everything looks of ordinary size, whilst in reality all is gigantic.

Such then is the power acquired by knowledge, and such is the incentive to the young architect to study every branch of science which bears in any degree on the composition of his designs, or their thorough execution.

DECEPTIVE ESTIMATES.

FROM time immemorial complaints have been frequent of "extras" charged by builders in the carrying out of a definite and attested contract. To such an excess has this been carried, it has become a reproach keenly expressed in the saying—"as distant from the truth as a builder's estimate." Why should this be the case? We answer, because of the uncertainty of the proposition on which the builder is, most generally, compelled to form his estimate, and this uncertainty arises from, first a want of thorough knowledge of the required execution of the designs, either as regards quality of work or material, or the manner in which certain requirements of the architect are to be carried

out so as to meet the objects of the said design as conceived by him.

The specifications, it is well known, are the written instructions of the architect to the builder, and to each and every executive department under him concerned in the carrying out of the work; and as these specifications are so needful to the just appreciation of the architects intentions, it is obvious that they should be so framed and worded, as to be distinctly understood by the mechanics, who propose to bind themselves to do work in perfect accordance with them.

Now, how often does it happen that architects do not lucidly state their wants in these documents of instruction

How often is it the case that certain things are, intentionally or unintentionally, obscured? Intentionally, we say, because of the desire to keep down the estimate of the proposer, which too often controls the mind of the architect, who is fervently desirous of having his design accepted and executed, and who knows, that should the proposals overrun the sum intended, his client will be alarmed, and resolve, either to change the design, or to relinquish his present idea of building.

In cases where the architect is allowed to choose his own contractor, the matter is easy enough; for, he will prefer the one who knows his peculiarities best, and to whom his specifications will not be as vague as they would be to a total stranger. But, the client is desirous of having open competition, in the hope of getting a "low proposal," and this desire opens the flood-gates to a torrent of mischief. Unqualified, incompetent "jobbers," crowd in their hap-hazard offers for work, and will even try to influence the decision of the proprietor by private advice and glowing promises. Anxious to have the work executed at the lowest cost, the proprietor lends a too willing ear to these cunning schemers, and perhaps overrules the architect in the decision, accepting bail which, in his leniency, he considered good enough, and felicitates himself on the successful issue of the competition as far as he is concerned. The contractor goes to work and is not long in finding out that the quiet little expression, "workman-like manner," means much more than the specifications expressed; and that the architect's ideas of how the execution was to come up to the workmanlike, were far beyond his. Now begins the contest between the architect and the builder. The former has his professional character at stake, and insists on the contract being carried out as fully to the perfect advantage of his design as possible. The latter looks to his own interest, (naturally) and regards the architect's

requirements as an imposition on him. He soon begins to grumble, and hints dark things to the proprietor against the architect's capability. The latter in some way hears of his secret treason and becomes harder on him. The builder openly questions the meaning of the words of the specification. The architect triumphantly refers him to the finishing clause of such specifications, intimating that wherever there shall be any doubt, or even an omission, said doubt or omission shall be rendered according to the "true intent and meaning" of the architect. Notwithstanding that this grave protective clause bars his rebellious way, the contractor looking distractedly at the threatening insolvency before him, finishes his work as best he can, and forthwith commences a law suit, in which he is almost sure to beat the proprietor; for, of course any jury of mechanics will sympathize with him, and read the specification as he read and understood it. Now, who is to blame?

No architect in fair practice can afford the time to write a specification as perfect that no escape holes can be picked in it, and there never was, we believe, a specification written that did not require some explanation on the part of the architect.

Furthermore, it is invariably the case that, in the progress of the work, the architect discovers some little discrepancies in practice that were not looked for in the theorizing of his design, and of course he requires that such shall be made right. The contractor, if he is a loser by the job, will be very likely to charge the proprietor for all these little "extras," so as to save himself as much as possible; and it is in this way that the cost of a building is greater than the estimate on which it was built; and the proprietor is dissatisfied, and deems himself duped.

Is there no way of remedying this very unfortunate state of things, and of dispelling this long time dark cloud

which hangs over the progress of building?

We think there is. Three parties, however, have an interest in the reform which we propose. One is the architect, another is the builder, and the third is the proprietor or party building.

The architect's interest is that his design, in its executed state, shall give satisfaction, without any drawback of undue expense to his client.

The builder's interest is to do his work in a skillful manner, to the satisfaction of the architect and the proprietor, without compelling the latter to pay more than his original agreement, and at the same time to secure fair profit to himself.

The proprietor's interest is, by giving sufficient margin to his architect, to enable him to see the chosen design duly carried out, without the annoying consequences above alluded to; and not to interfere with that gentleman in the exercise of his professional duties, but patiently await the completion of the work. The architect has studied the subject and knows infinitely more than the proprietor regarding its several bearings.

So that these three most interested parties have to pull together to ensure a unity of action and an unqualified success.

The proprietor, moreover, has it in his power to do a great amount of good to our profession, simply by a "masterly inactivity." Let him not encourage the approaches of those low cunning interlopers in the building business, who hang about architects' offices, when proposals are wanted, and are ever on the alert to catch at any private conversation to find out what way the cat is likely to jump, and how far; pushing in at the final moment a "guess" offer for the contract, without troubling themselves a great deal as to what, or how much is to be done, or in what manner. They sub-let the various parts of the work, and, in too many instances, suc-

ceed in swindling alike the artizans and the merchants, who trusted to their honesty, and come out with a handsome profit. Liens are entered against the building, and the proprietor has to suffer for his temerity in tampering with such sharpers.

We say the proprietor can serve the interests of building by not interfering, but rather placing reliance in his chosen architect, and letting that medium stand between him and the builder.

There are influences, outside of those just spoken of, which tend to inflate the expense of building: They are "strikes," and the rise of materials. Neither of these have a right to exercise any influence on the proprietor in his settlement, according to the contract, yet such are taken into account very frequently, and allowed for, by the kindness of liberal minded men, pitying for unseen misfortunes, and honorably reasoning that they have the benefit of the work, and that none should suffer for their advantage.

The wholesale contract system is however a very bad one, and should be entirely abolished. In place of it, we would adopt the practice generally of letting out to the several artificers independently; thus giving to each trade the just profit on its own work.

This arrangement at once reduces the expenses of building; for, each department of work is fairly paid, and there is no second profit to be derived by one man assuming the whole and grinding down each under the title of contractor. Moreover, each work is mechanically executed, and not slighted to suit the eye of a contractor who may know little or nothing about it, either as to material or quality of work.

We know that this separate contract system is popular with the trades, and that the wholesale contract mode of giving out work is hateful. The general government long since discovered the advantages this satisfactory system of independent contracts possesses, and prefers "days work" to it.

Architects will not hesitate between the two modes of execution, on the one hand by wholesale, or on the other hand, by independent contract, but will undoubtedly see their best interest lies in that which gives to every workman his own legitimate share and incites his pride of craft to struggle for distinction, by executing that part of the architect's requirements which

come under his control, in a workman-like manner.

With such a system the architect would have justice done his designs. The proprietor would be insured against the law troubles, which now so surely await him, and the trades connected with building would prosper. "Extras" would be no more, and estimates might be relied upon.

CONCRETE BUILDING.

THE actual merit of any material is certain to make itself known sooner or later, and this is most decidedly the case with *concrete*, or *béton*, as the French style it. Nearly forty years have passed since concrete was first introduced in London, merely as a sub-structure at first, and one which gave such positive evidence of reliability, that Sir Charles Barry did not hesitate to use it for the foundation of his enormous pile, the Palace of Westminster, and even for the esplanade on the banks of the Thames. The Custom House of London, which was giving symptoms of instability, had its decaying foundations removed, and concrete run into the vacated trenches, whilst the heavy structure itself was sustained mechanically during the operation of "filling in."

We mention these facts in proof of the almost instant recognition of the good properties of concrete, by the first architects of England, in that day, and we may add that, up to the present time, that simple yet wonderfully advantageous discovery has gained ground steadily.

The formation of concrete was not unknown to the artisans of antiquity, as we find by numerous discoveries of recent date; but the knowledge of it was a sealed book, or a lost art to our

builders up to the time above alluded to. Our American builders were at first rather loath to believe implicitly in the virtue of the new discovery, and piling and planking still went on in the making of foundations. Concrete, however, did not fail to win even their good opinion, and each year found it progressing in favor, until its use actually became the rule, instead of the exception.

Nay, even its merits were rather exaggerated by our awkward countrymen, for from the humble office of supporting walls it was speedily (we might say thoughtlessly) promoted to the substantiality of the walls themselves! But this was a jump in the dark, an over-reaching stride, which was productive of mischief to those who ventured it, as well as injury to the character of a rising reputation for reliability which concrete in its first office so fairly earned. The evil remedied itself, however, and the bungling first efforts at moulding walls in concrete had, in their failure the merit of a good though severe example, which failed not to deter imitators from venturing on the unknown process.

The growing popularity of this admirable material has been such in England as well as France, of late, that we feel it our duty, as faithful watchers of the best interests of our country, to give

every item of information we can glean in foreign fields, in the pages of the *ARCHITECTURAL REVIEW*, and it is with this object we now give the following interesting extract from the pages of our able and industrious cotemporary the *London Builder*.

Some time ago we alluded to the erection of a large and lofty warehouse wholly of concrete, in Great Guildford-street, Southwark. We have recently visited it, and find it standing remarkably well. It was built by the owner, Mr. H. Goodwin, Mr. E. P'Anson being the architect. Mr. Goodwin, who is laying himself out to execute other buildings in this material, has given us some particulars of the work, which may be usefully printed:

At your request I will as briefly as possible give you an account of the concrete warehouse in Great Guildford-street, built by me. In the first place, the concrete is composed of one part of best Portland cement to seven parts of material consisting of clean Thames gravel, crushed slag and clinkers from furnaces, crushed bricks, stone chippings, oyster-shells, pottery, hard core from dust-yards, and any other hard and incombustible material I could get. After waiting *twelve months* for the Metropolitan Board of Works to consider whether or not Portland cement concrete was applicable to building purposes, I at last got consent to proceed with the work. We built upon an average per day about twelve inches all round the walls, grouting in with sand and cement at every fresh layer of concrete. We also put in hoop-iron bond at each floor. We could have built eighteen inches per day, which is the depth of the apparatus, but I considered twelve inches quite fast enough for a building so high; though at other smaller jobs I have often built three feet per day. The building is seventy feet by fifty feet, and sixty feet high. It consists of basement and five floors, each floor supported by twelve iron columns.

The roof is of concrete three inches thick, laid between tee-iron three feet six inches apart, covered with asphalt. The thickness of walls is to the brick rule; those seventy feet, two floors twenty-seven inches, two floors twenty-two inches and two floors eighteen inches; the fifty feet walls are, two floors twenty-inches and four floors eighteen inches. The cost of the walls considering I got a great deal of the material for nothing, was under 6*l.* per rod; or, take the whole of the building as a cube, the cost was about 3*d.* per foot. It is very strongly built, and as good as one of the warehouse class can be. It is now loaded with goods, every floor full, and has never shown the slightest crack or settlement. It is harder than most kinds of stone used for building purposes, and is of one solid mass from beginning to end. While in course of construction I was honored by visits from many members of Parliament, most of the members of the building profession, and many other gentlemen, who took great interest in this great test and experiment in building, as well as by yourself. Thanks for your good remarks in the *Builder* at that time.

As with Mr. Tall's patent apparatus (with which it was built) a perfect surface is obtained throughout, it requires only a thin coat of cement and sand to finish the walls perfectly smooth and true. I quite agree with Mr. P'Anson in his opinion "that the success of such work depends on the entire honesty of the man who does it."

I have learnt so much of concrete with this and other contracts I have taken since, that I find the greatest care must be used in choosing the material. I have made specimens of all kinds. Many persons, and amongst them builders, think if they have gravel, by adding the cement they have all that is required to make concrete. So much depends upon the gravel, that if it is not the right sort the work will cost as much as brick-

work, and then never be sound. Every bit of loamy matter and dirt must be washed out thoroughly; then you must replace with clean sharp sand, about one-fourth.

Those who wish to build of concrete should only do so where the material is on the spot or very near. Clean river ballast, with a good proportion of sand, is as good a thing as we can have for Portland cement concrete. If some crushed slag or furnace clinkers can be mixed, so much the better; it is also lighter, which is a good thing in wall construction. Burnt clay is also very good material, provided it is well burnt. Great care should be taken to sift with a fine sieve all crushed material; for, let it be what it may, dust, loamy matter, or fine sand, if it is finer than the cement itself it will dilute and kill it. I have made specimens of concrete with gravel that have become as hard as the best stock brick, and I have made others, with the same proportion of cement, that you may crush and crumble in your hands. There is much gravel in some parts of Surrey, all small round stones free from loam, but containing a very fine sharp sand. Many would think it good for concrete; but use it, and take whatever care you please, the concrete will be little better than if you had only mixed it with water; the reason is, the sand being finer than the cement, kills it.

The concrete chapel I have just completed at Snaresbrook, in Essex, is built of the refuse of the brick-fields, mixed with sharp sand got from a good depth, there being a sewer in course of construction close by. The concrete is composed of one part cement to seven parts of material. The prime cost of the walls, including the working the apparatus, was 7*l.* per rod. Many of the statements that have appeared in print upon concrete are not correct. It has to be borne in mind a yard of concrete mixed dry, when wetted and put into the apparatus, falls considerably short of a yard,

at least fifteen per cent. Neither does the cement make bulk, but disappears in measure, as does the water. If lumps of stone can be got, or brick burrs, or old bricks, to pack into the wall, it makes better work and cheaper. The more the cement can be displaced the better for the work and the less the cost. Great care should be taken the cement is not too fresh, or it will cause the work to crack. It should be at least a month old before using.

The concrete villa at Addiscombe-road, Croydon, is now completed and occupied; it gives great satisfaction, and, it is said, will be the only house the rain will not penetrate in that neighborhood. The lower floors are all of concrete and perfectly smooth and warm; there is no channel for a mouse or any creeping thing in that house, unless it takes up its abode with the family. I forgot to remark, the porch in front of the chapel at Snaresbrook is built of white brick, by desire: the whole of the other work to the walls around, some one hundred and thirty feet long, five feet high, six inches thick, without a pier, are all of concrete. Some of the walls near by are twelve feet high, and nine inches thick.

In the course of these particulars, Mr. Goodwin makes an observation on which we may usefully enlarge. He says: "It has to be borne in mind a yard of concrete mixed dry, when wetted and put into the apparatus, falls considerably short of a yard—at least fifteen *per cent.* Neither does the cement make bulk, but disappears in measuring, as does the water." In the prize Essay on concrete, by the conductor of this journal, published in the first volume of the transactions of the Institute of British Architects, this loss of bulk in making is pointed out, and experiments are referred to which show a diminution in those particular cases of about one-fifth.

In the year 1857, Mr., now Professor, Lewis, read a paper at the Institute of

Architects with the view of showing that this asserted loss did not take place. The writer says:

The general idea with respect to this material is—first, that there is a sensible loss in bulk of the ballast, independently of that of the lime; and, second, that the materials, on being mixed together, expand considerably. So much is this idea prevalent, that a respectable builder—one, I am sure, quite above stating anything that he did not believe to be true—required, in calculating the price of the concrete, that I should allow him one-seventh more ballast than the concrete cubed to, he depending on the published statements of the loss of ballast being thus great. It was this demand that first led me to experiment. The following trials were all made in the same manner, and, with one exception, I was present at the whole process from beginning to end. Several of the committee of the Architectural Publication Society also attended at the trials. A wooden box was made, holding exactly one cubic yard. This was filled with a fair sample of the ordinary Thames ballast, and such as is used for concrete in London. To this was added ground Medway grey stone lime, in the proportion of one of lime to six of ballast. The whole was then turned out and mixed together in the ordinary way, the cube yard taking about forty gallons of water. The whole bulk would thus stand as follows:

Ballast.....	27 feet cubic.
Lime..... $4\frac{1}{2}$ }	$10\frac{1}{2}$ do.
Water.....6 }	

Total..... $37\frac{1}{2}$ do.

The concrete, thus mixed, was thrown into the box from the level of the ground, so that the lower part would have a fall of about four feet, and the upper part of one foot. The experiment was also made of throwing it in from a platform, ten feet above the ground. In each case the result was the same, viz., the whole mass, made into concrete, occupied precisely the same space as the dry ballast, viz., one cubic yard, all the bulk of the lime and water, being about two-fifths of that of the ballast, being lost, but none of the ballast itself. The surface was carefully levelled, and thin boards tacked over, so as to ascertain if there were any expansion in the setting, but none could be perceived.

We need no inquiry to assure ourselves that as a rule, whatever might have occurred on the occasion described by Mr. Lewis, the original statement as to a loss in bulk was correct. In order, however, to obtain the experience of others on the point, we made numerous fresh inquiries, and found the answers so unanimous in confirming our views, that it seemed unnecessary to notice the contradiction. The statement, however, that there is no loss in bulk of the ballast having been adopted in consequence in more than one book of reference, and loss having accrued to individuals in several cases through faith in it, it is desirable that the truth should be established.

The Messrs. Lucas wrote:

We have the pleasure to forward you, as promised, the following particulars of experiments made with concrete. They were made at the new Italian Opera House, Covent Garden.

A deal measure, three feet by three feet, and three feet deep, carefully made for the purpose, was placed upon a wood floor, and filled with ballast thrown in from a shovel, and made quite level on the top. The ballast was then taken out and mixed in the usual manner (upon the wood floor,) with three bushels of ground stone lime, and thrown again with shovels into the measure whilst hot; the concrete, when first put in, exactly fills the measure, as did the ballast before being mixed with the lime.

A deal measure was used in order to ascertain if any expansion took place, but as it retained its shape, none occurred horizontally, nor did any appear vertically.

The experiments were made with "gravel taken from the excavations, well screened, and with unscreened Thames ballast, the same quantity of lime being used to each, and the operation performed alike in both cases. When set, the concrete formed with the screened gravel, had diminished in height about one and a half inches, or one-twenty-fourth, and that formed of Thames ballast unscreened, about two and one-fourth inches, or one-sixteenth. We think, however, that had the concrete been thrown in from a stage, the subsidence would have been greater, most probably one-twelfth, and should not think it safe in making an estimate to calculate the subsidence, as less than one-twelfth."

Mr. Edward Druce, the resident engineer at the Dover pier works, says:

"I have found that with the materials such as we have, twenty-two parts of the materials when mixed together and measured dry make about seventeen and a half parts of liquid concrete."

Mr. Plucknett (W. Cubitt & Co.) said:

"We have found from actual experiment that five thousand seven hundred and twenty-two cubical yards of Thames ballast made four thousand eight hundred and ninety-one cubic yards of concrete. It was thrown from a height of ten feet. This quantity of concrete consumed five hundred and forty-four yards of *ground stone lime*."

The result of some experiments made by Mr. Buckwell at his Phoenix Stone Works, East Greenwich, was, that "a cubic yard of cement concrete contained thirty-four cubic feet of ballast and five cubic feet of cement."

Mr. G. Robertson, the resident engineer at Leith Docks, wrote more fully, and thus:

"When the ballast was moderately dry, twelve cubic yards of ballast and two cubic yards of fresh ground *lias* lime made eleven cubic yards of concrete mixed and deposited, the waste from the dry materials being then twenty-two per cent.

But, if the ballast was very *dry*, the same quantity might only make ten cubic yards, and *vice versa*. The first quantity

is the average, however, of thousand of yards, and may be depended upon as accurate in practice, with the above proportion of lime.

A cubic yard of concrete requires on the average thirty-eight gallons of water of mixture, of which eight gallons are required chemically to form hydrate of lime, and thirty gallons remain free in the concrete.

The expansion in setting, varied from an extreme of one-thirtieth in hot summer weather to one-forty-eighth in winter, during cold weather. This is the expansion for a cubic foot enclosed in a box; on the large scale it is not so great, as the weight of a mass above aids in keeping it down. With *lias* lime, which slakes slowly, there is expansion going on for perhaps a month. More particulars about the *lias* lime will be found in a paper I read before the Institution of Civil Engineers in 1858."

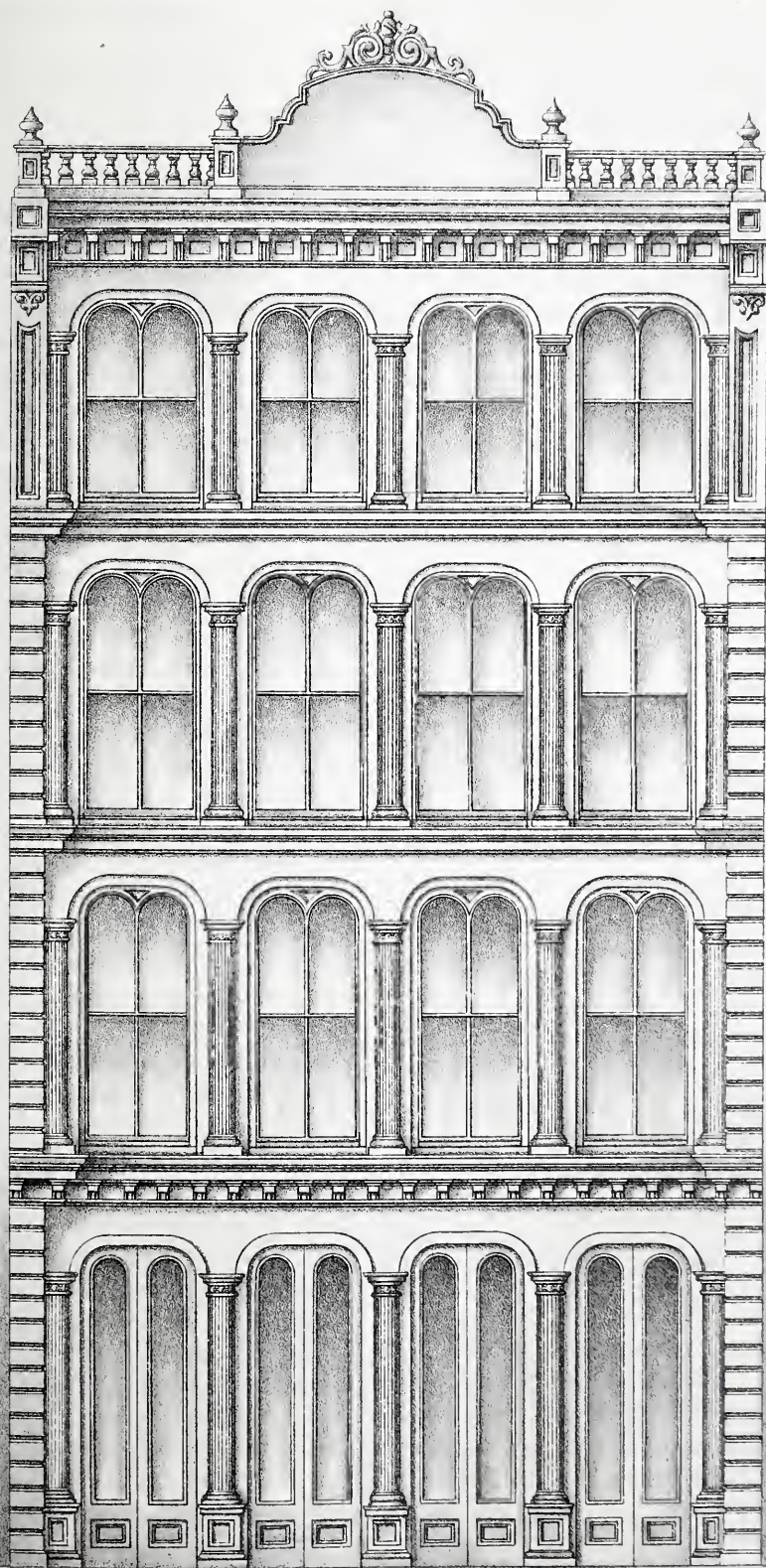
The use of concrete will probably extend, in domestic and public building, and it is of importance that all the circumstances attending it should be rightly understood.

IRON STORE FRONTS.

THE design shown in the accompanying illustration is one which has for its chief recommendations, unity and simplicity of manner.

There is no subject in the whole range of our constructive art which demands more method of arrangement than store fronts. The display which most business men require, must also have an amount of light to meet all the requirements of the particular stock to be shown. Some trades demanding all that can by any possibility be given, and as this requirement of light has to be met, and that too on the first story, it is evident that the superstructure has to be robbed of much of its natural support to afford

the opening so demanded. It is not to be escaped in any way that the piers of the superstructure are evidently dependent on nothing, and that such a state of things brings forcibly to mind the Egyptian theory of "the world resting on the back of an elephant, and that patient animal standing on a tortoise, whilst the tortoise rests on nothing!" Thus, the piers in the superstructure are worse than meaningless, for they rest on no apparent support directly from the ground. They are actually upheld by the framed *bressummer*, which is carefully hidden from view by the store cornice, which latter seems to be its only means of dependence. A very frail one



IRON STORE FRONT.



truly, seeing that it bears only on the end pier itself, and is intermediately *sustained* by fairy-like frames filled with French plate-glass, so clear in itself as to present the illusion of emptiness. To this may be added, two attenuated columns, made as invisible as possible, and utterly repudiating the slightest confession of strength of purpose.

When timber was the only material used in store supports; and when the small dimensions of glass, compelled the frames of store windows to be necessarily divided into sash-rails of a competent thickness, then indeed the architect could present some show of superstructure, though even then there was much that was objectionable in the prevailing designs. But, the rapidly spreading reform created by the expanding dimensions of manufactured plate-glass, as well as the wonderful progress of architectural ironwork, soon changed the whole face of things, and gave to store fronts, all the privileges of light which could by any possibility be acquired by the attenuating of supports, or the almost illimitable expansion of sheer window space, filled with simple sheets of the clearest crystal glass.

The men of trade were pleased, but it was at the expense of truth in design. For, no matter what the strength of construction might actually be, the apparent weakness was such as to produce a feeling of discomfort, arising from a doubt of safety.

The design here presented, however, avoids this dilemma by giving sufficient height to the store, so as to make amends for the aggregate area of pier. Thus we see that there is ample and continuous support throughout, and positive strength is evident in every part. The whole front is iron, and the columns are unattached to the wall, all the way up; giving a remarkably bold effect of design.

It will be observed that the sides are so constructed, with quoins and antæ, as to enclose the whole façade and ren-

der it complete and independent of adjoining buildings.

This iron store front was erected in Pittsburg, by Messrs. ROYERS BROS, of this city, for Messrs. McCallum Bros, of that city, as a carpet warehouse; and the whole building is perhaps the most complete one erected for the purpose in the United States. The front is painted in imitation of white marble, and presents quite a unique appearance, in the midst of the smoke darkened walls of the busy Iron City.

The interior is the result of mature study, and presents advantages of light, etc., which are rarely to be met with in carpet stores, giving a most desirable advantage of business facility in a locality where light is, of all things, an object.

THE ST. JAMES' SPIRE.—During the past week many of our readers may have noticed the progress of the repairs being done to the steeple of St. James' Church. The cause of the repairs was owing to the copper being insecure in various places. The work was a very perilous undertaking, the workmen having to be raised in an apparatus like a chair, by means of ropes; but the most dangerous part of the undertaking was the repairs of the bell, which position could only be reached but by a suspended ladder, and it required great nerve and tact on the part of the workmen to accomplish the end desired. The work has been successfully executed by Messrs. Corbin and Nicolle, of Castle-reagh street.—*Sidney Herald*.

EPITAPH ON AN ARCHITECT.—The following is to be found on a monument in Walton Church, England, erected in memory of a worthy professional, whose mortal work was "topped off."

"Thy immortal tenement, immortal germ,
Hath sunk to dust, while all thy work stands firm;
O may'st thou at the rising of the just,
Thyself stand firm, when all thy works are dust."

ANCIENT ENGLISH DWELLING-HOUSES.

HAVING, in a previous number, given a very brief description of ancient Greek and Roman dwelling-houses, we now present a few notes on the style and construction of English residences, in the days of our ancestors, which may prove of some interest.

The numerous remains that are extant to this day of the Romans, during their occupation of Britain, would seem to afford indisputable proof that the manufacture of bricks and tiles, and their use in the building arts were known to and practiced by them at that early period. It has been asserted by some authorities that up to the reign of Elizabeth, the houses of the gentry throughout England were built entirely of timber, and that it was not until the reign of Henry VII. that stone or brick was used as a building material. But this assertion is not borne out by the fact of many mansions of earlier date than that reign, which remain entire or in part to this day, being built of either one or the other. For instance, Endre Palace, in Oxfordshire, erected by William Delapole, and Harstmonceaux Castle, in Sussex, both of which are of brick, and date back to the reign of Henry VI. Oxburgh Hall, in Norfolk, was erected in the time of Edward IV. Leland mentions that the walls of Hungerford, as early as Richard II., were also of brick, and Stow records that the bishop of London, Ralph Stratford, enclosed the burial ground in the Charter House, for those that died of the plague, in 1348, with a wall of brick.

That roofing tiles were in use before the time of Richard I., is proved by an order issued in the first year of that reign, Henry Fitzalwayne, being then Lord Mayor of London, that the houses of that city should be covered with "brent tyle," instead of "strawe" or reeds.

The ancient name for bricks appears to have been "wall-tiles," in contradistinction to floor-tiles, used for paving.

James I., enforced by proclamation the use of brick and stone, in the building of London, and throughout the kingdom, in place of wood, for the purpose of preventing the too rapid consumption of the native forests, as well as to ensure greater security against fire.

The chief feature in the interior of ancient English residences, in the days of the Henrys and Edwards, was the great or stone *hall*, which was the origin of the custom of the name "hall" being given to the entire house. It corresponded to the refectory of the abbey. The principal entrance to the main building, from the first or outer court, opened into a *through lobby*, having on one side several doors or arches communicating with the pantry, kitchen, and other domestic offices; on the other side, the hall, parted off by a screen, generally of wood; most elaborately carved and enriched with shields and other ornaments, and pierced with several articles having folding doors. Above the screen, and over the lobby, was the minstrels' gallery, the front of which was generally embellished with old family armour, antlers, and others memorials of exploits in the field.

The hall itself was a large and lofty room in the shape of a parallelogram; the roof, the timbers of which were paved with pendants, richly carved and emblazoned with heraldic insignia, formed one of the most striking features. At the upper end of this chamber, the furthest removed from the entrance, the floor was raised one step, and this was called the *dais*, or upper place. On one side of this dais was a deep bay window, extending down almost to the floor; the other windows, on both sides of the chamber, were raised suffi-

ciently above the ground to leave room for a wainscoting or arras below them. These windows were in most instances fitted with stained glass, representing the armorial bearings of the family, and all their connexions, and between the windows were hung full length portraits of their ancestors and royal patrons. In a very conspicuous position, at the upper end of the hall, were placed the royal arms. A table was laid on the dais, parallel with the upper end wall, for the lord and the principal guests, and other tables were ranged along the sides for the inferior guests and the retainers. In the earlier times, in the very centre of the hall was the *rere dosse*, or fire-iron, against which fagots were piled, and burnt upon the stone floor, the smoke passing through an aperture in the roof immediately overhead, which aperture was generally formed into an elevated lantern, forming a very prominent feature in the exterior of the building. From this custom of having the hearth in the middle of the apartment, arises the expression which is still in common use among us of "sitting round the fire," handed down from the old saying, "round about the coal fire." In later times, a wide arched fire-place was formed in the hall on one side of the room.

The origin of the word *mantel*, used in reference to a chimney-piece, is traceable to its being work raised before a chimney to conceal it; *mantel* originally signifying a cloak. The earliest mention of chimneys is in the year 1347. If the houses of the ancient Romans had been furnished with them, Vitruvius would have described them; yet not a word about them is to be found in his works. That they were not known in England, in the eleventh, twelfth, and thirteenth centuries, is proved by the curfew (*couvre-feu*) bell, which was rang by a law of William the Norman, and which has become familiar to us all, from the reference made to it by Gray in his immortal Elegy. The allusion at the

above date (1347), the earliest of which we have any authentic record, is to an earthquake in Venice, which threw down many chimneys.

Many examples of these ancient baronial and conventional halls, are to be met with even at this day in England, preserving almost their original form and appearance, and in very few respects, indeed, altered since the Tudor era. The great halls at Christ Church, or Trinity for instance, preserve almost intact, not only their original form, but even the identical arrangement of the tables, and it would not require a very great effort of the imagination of our observer to picture to himself these halls as they appeared when inhabited in those feudal times.

The finest specimens are the magnificent hall at Westminster, built by Edward II.; and the great hall, at Eltham, attributed to the same monarch, and but little inferior in grandeur to that of Westminster.

We might here say a word as to the description of furniture, which formed the accommodation of the princes and prelates, as well as the old English barons and lords in those early days. Heavy tables, formed of planks laid upon tressles, massive oak benches or stools for seats, and floors strewn with straw, such were the ordinary furnishings of their apartments. Even in the time of Elizabeth, the comfort of a carpet was but rarely seen, and the luxury of forks wholly unknown. Rushes were the substitute for the former, and fingers supplied the place of the latter. Their usual bed was a straw pallet, or rough mat, covered only with a sheet, (often without this), with a good round log under their heads instead of a bolster or pillow.

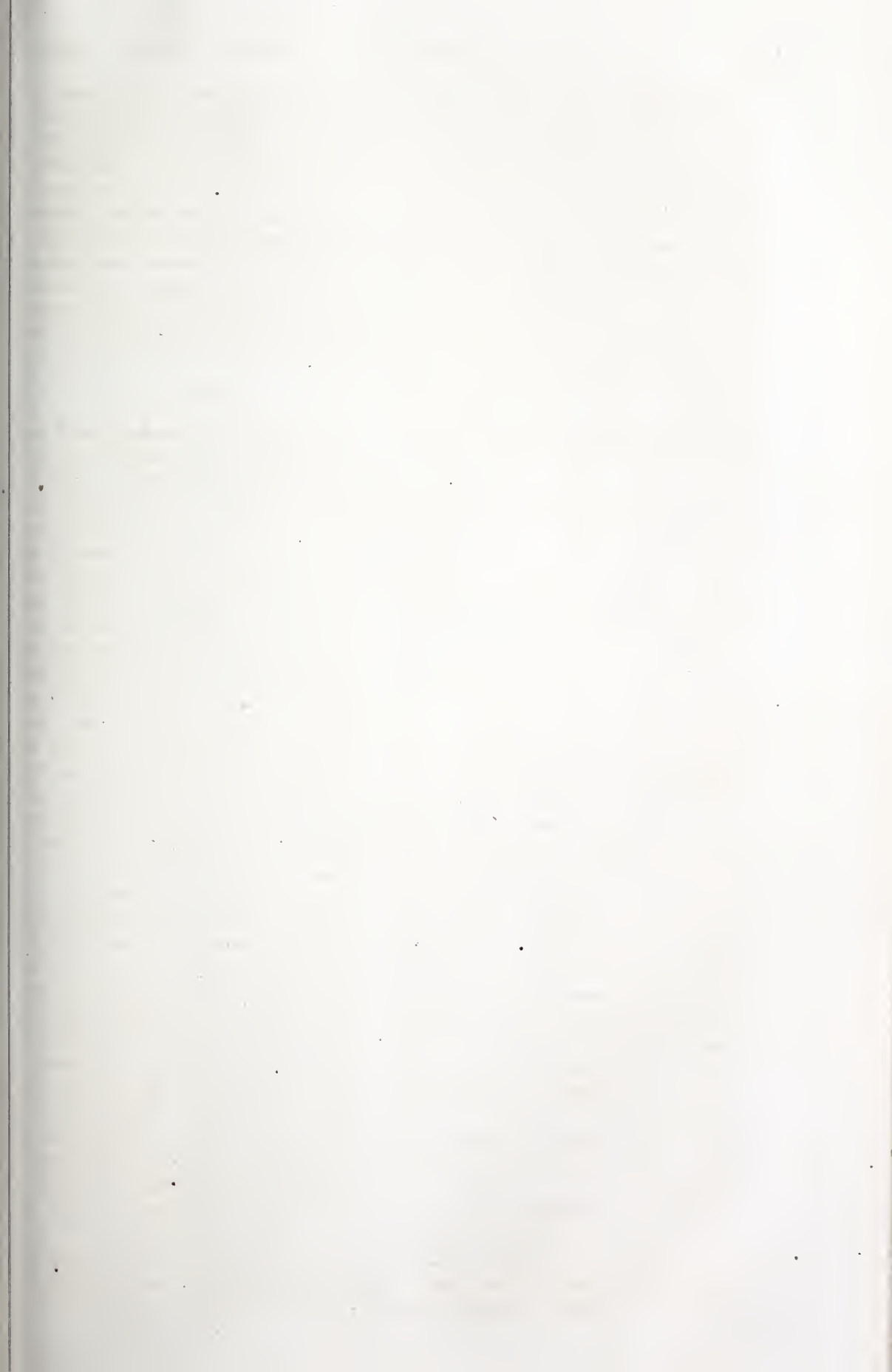
NEWARK, N. J., has eighty-nine churches. Estimating the population at 130,000 it would give a congregation of 1,461 souls to each church.

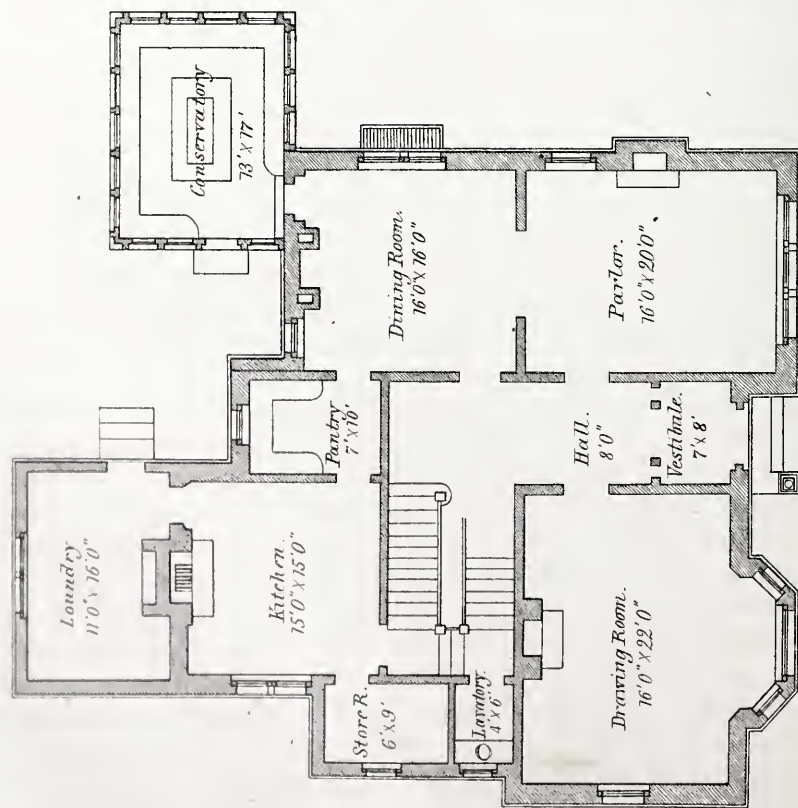
ORNAMENTING GLASS.—Mr. George Rees, of Holloway, has lately patented an invention for producing ornaments or devices by vitrifying pounded glass upon glass and glazed ware, or by cementing together fragments of colored glass or glazed ware by vitrifying a layer of pounded glass on to the fragments. The glass, after it is pounded, is sifted through sieves, the meshes of which correspond to the sizes of the particles of glass to be used on the surface of the glass or glazed ware. The *modus operandi* is as follows: Take a sheet of glass and prepare the surface by brushing a gummy or other adhesive liquid thereon. Then sprinkle pounded glass over the gum, which adheres to it. The glass thus prepared is placed in a furnace, or under heat in any suitable manner, in order to vitrify the pounded glass upon the surface of the sheet glass. The pounded glass may be of one or a mixture of colors, or the sheet glass may be of a white or other color. When it is required to form a pattern on the surface of the sheet of glass, cover the intended part with gum, and then sprinkle the required colored pounded glass on it. The other portions of the pattern are likewise similarly prepared, and pounded glass of a different color is sprinkled on those. These operations are repeated until the required number of colors are sprinkled on it. The sheet of glass is then heated to the required degree to reduce the pounded glass to almost a liquid state; when the glass is removed from the furnace, the pounded glass is found to have fixed itself into or on to the surface, and forms a rough face. If the sprinkled sheet of glass be left under heat for a longer time, the pounded glass runs and intermixes itself in the surface, and thus produces a smoother face.

In carrying out the second of the above described methods of this process, the inventor takes broken or shaped fragments of colored or plain glass, or glazed ware or metal, and arranges them

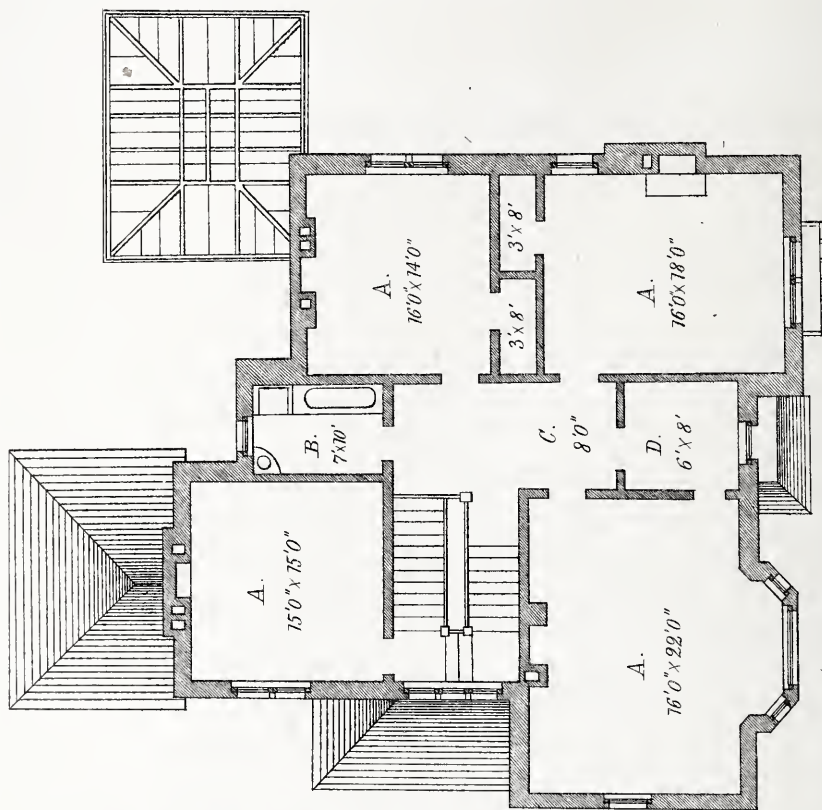
in any desired pattern, placing them in a metal mould. He then spreads over them a layer of pounded glass or other vitreous substance in such a manner that the powder shall enter the interstices between the fragments forming the pattern to such a depth as may be convenient. He then removes the whole to a furnace and vitrifies the mass, cementing together with a thorough vitrified cement the colored device and giving it a solid back.

A CHAMBER OF COMMERCE FOR LONDON.—At last London seems about to have a Chamber of Commerce. A meeting is to be held on the 14th instant, when the necessary preliminaries are to be gone through. Of the advantage of such an organization there should be no doubt, and we believe there is none. It is what most persons have spoken favorably of, and very few assisted to put it into practice. To other towns this indifference must appear inexpressible. Considerably more than half the Custom duties derived from the trade of the United Kingdom, is paid by the city of London. The interests to be discussed are therefore of almost imperial importance. The fact is that London business men are for all purposes of association in London, but not of it. A few hours a day only interrupt their suburban residence. Of tendency to combine there is little or none. It is no matter whether for municipal or commercial objects; the higher class of traders do not associate. This is unfortunate, and it is expected of a Chamber of Commerce that it will tend to neutralise this tendency. What is wanted is, that those engaged in the business of the city should recognize their common interest, should co-operate. The Royal Commission which reported in 1854 on the constitution of the city of London, strongly advocated a closer union between the mercantile and municipal interests.





FIRST FLOOR.



SECOND FLOOR.

GROUND PLANS OF SUBURBAN VILLA.

A SUBURBAN VILLA.

[SEE FRONTISPIECE.]

OUR frontispiece for this month is selected from an admirable English work, *Villa and Cottage Architecture*, published in London, in 1868. We have also availed ourselves of the general description as given in the work in question, making such slight alterations as will adapt it more particularly to the wants of this country.

There is much that is useful and beautiful to be gleaned in the field of design in highly cultivated England, with all its wealth of taste and means; and we know that there is (or at least there ought to be,) a fraternity of artistic feeling, which would lead the well established brethren of our noble profession, in its beautiful island home, to reciprocate our love of art, and freely lend their thoughts towards our training.

Taking for granted, then, the permission we would seek, we proceed to introduce our readers to the description referred to:

Our present subject of illustration, entitled "The Sycamores," is a house erected in 1864-5, in Seymour Grove, at Old Trafford, a locality situate south-west at Manchester, and which is rapidly assuming the character of a suburb of that town. The site of the house, and the land immediately surrounding are flat. The principal front looks west, or towards the road. Seymour Grove, which runs north and south, that is to say, parallel with the front. The drainage in the Grove being at no great depth, the level of the principal floor of the house is raised six feet above the surface of the site. The house being quite detached, each of its four fronts was studied for effective appearance; and there is no "back," as is commonly the phrase. The general character and details of the design, may be described as modernized domestic gothic, of the English variety,

subordinated to the expression of the chosen materials; of which the most important is the red brick of the locality. There are, however, no arched heads to the windows; lintels of stone are substituted, and some of the windows have mullions of the same material. Stone is but sparingly used in the structure.

The building was specially contrived so as to get a considerable amount of convenience without any extended area of the ground. Thus whilst the kitchen is on the ground level, or nearly on the level of the principal floor of the house, there are altogether three stories in that portion of the area, which are practically within the height of two stories in the other division of the plan, though, it is to be observed, one of the three stories, containing one bed-room, is partly within the roof. There are, indeed, in the house, seven distinct levels of floor, including a basement proper.

There are three day-rooms, or reception apartments, and a conservatory. Five bed-rooms, to one of which a dressing-room is attached, and the attic, or room entirely within the roof. The house occupies an area of which the principal dimensions are 60 feet in depth, and 50 feet frontage, not including the projection southward of the conservatory.

GROUND FLOOR.—A grass-terrace extends along the western and southern sides of the house, and a portion of the northern, where are the windows of the principal rooms. This terrace is reached from the ground around the building, by two flights of steps; whereof, one to the entrance of the house is provided with gas lamps of very ornate design. The terrace being crossed, there is an ascent of three steps under a porch to the front door, placed in one of the re-entering angles of the plan. The external

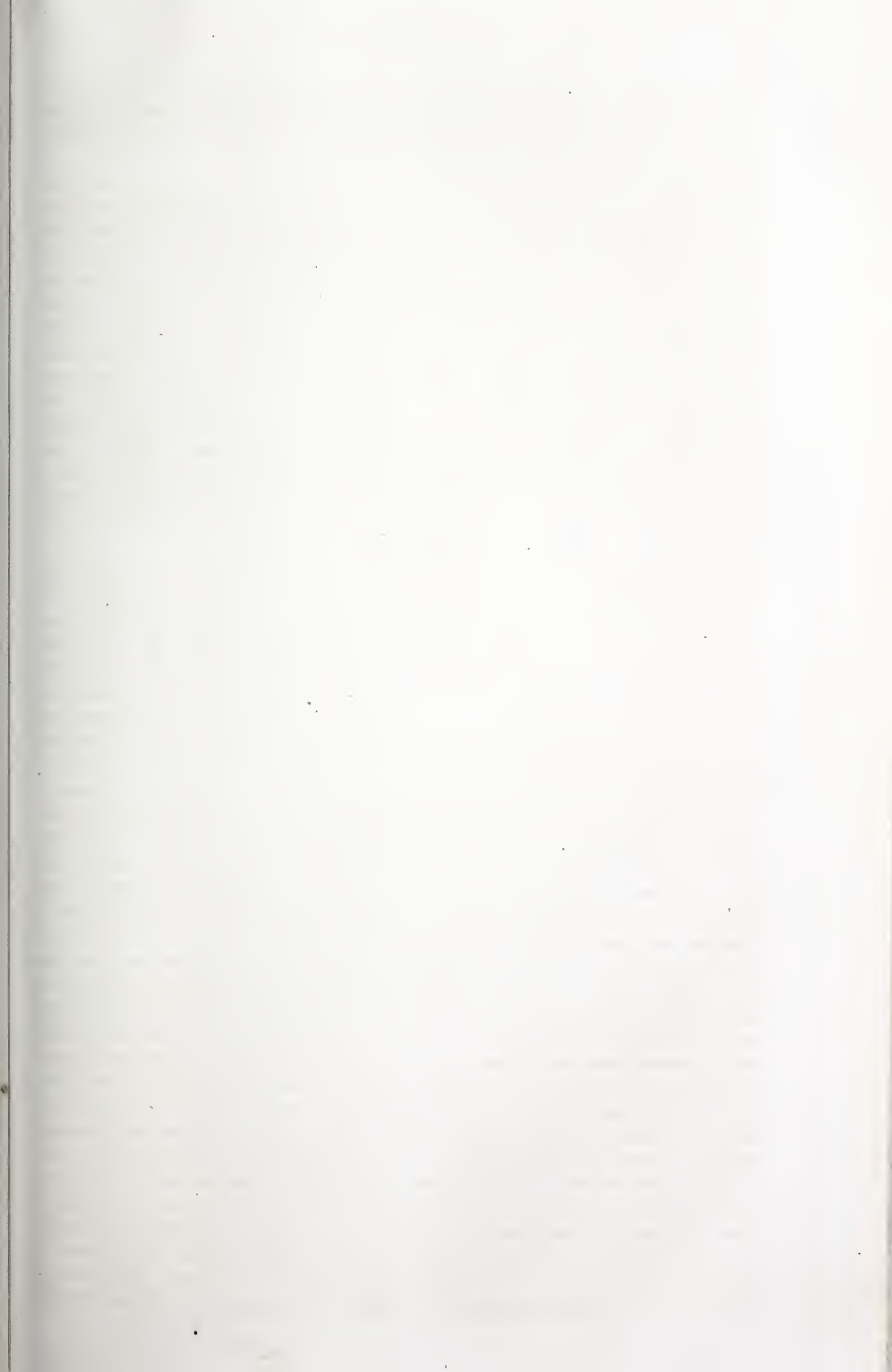
angle of the porch, is formed by a stone column carrying a block for the support of one of the skew-backs of a pointed segmented arch, the opposite skew-back being carried by the angle of the building. The porch is terminated by a weathered coping of masonry. The entrance into the house is, first into a square vestibule, which receives its light through a glazed sash in the door, and through a fan light. Beyond this, but separated by folding doors, in a glazed screen, is the hall itself; from which doors lead into the parlor and dining-room, and a door to the left leads to the drawing-room. The two most important rooms have their principal windows in the front of the house; and each has a smaller window in one of the sides. In the case of the parlor, this latter window has, opposite to it, that flight of steps by which the terrace is reached on the southern side. The large window of the parlor is in three lights; that of the drawing-room is in an octangular bay that is carried up to provide for a similar window in the story above; and is covered at the top with a hipped projection from the main roof. The dining-room which, like each of the other rooms, is lighted by windows on two sides, has a door-way out of it into a conservatory, whence there is a door-way, with steps, into the garden. At the end of the hall opposite the dining-room door, is the principal stair-case, lighted from the north, by a long window, which is filled with stained glass. Under the stairs are a lavatory and store-room; these form portions of a small addition to the main building, and are covered by a lean-to roof. In the end of the hall, between the dining-room and kitchen, is the butler's pantry, fitted up with all the necessary conveniences, and lighted by a window from the rear. To the kitchen is attached a laundry. Each of these apartments are furnished with a sink; with a cooking range to the kitchen, with water-back, circulating boiler, and a copper boiler in the latter for boiling clothes.

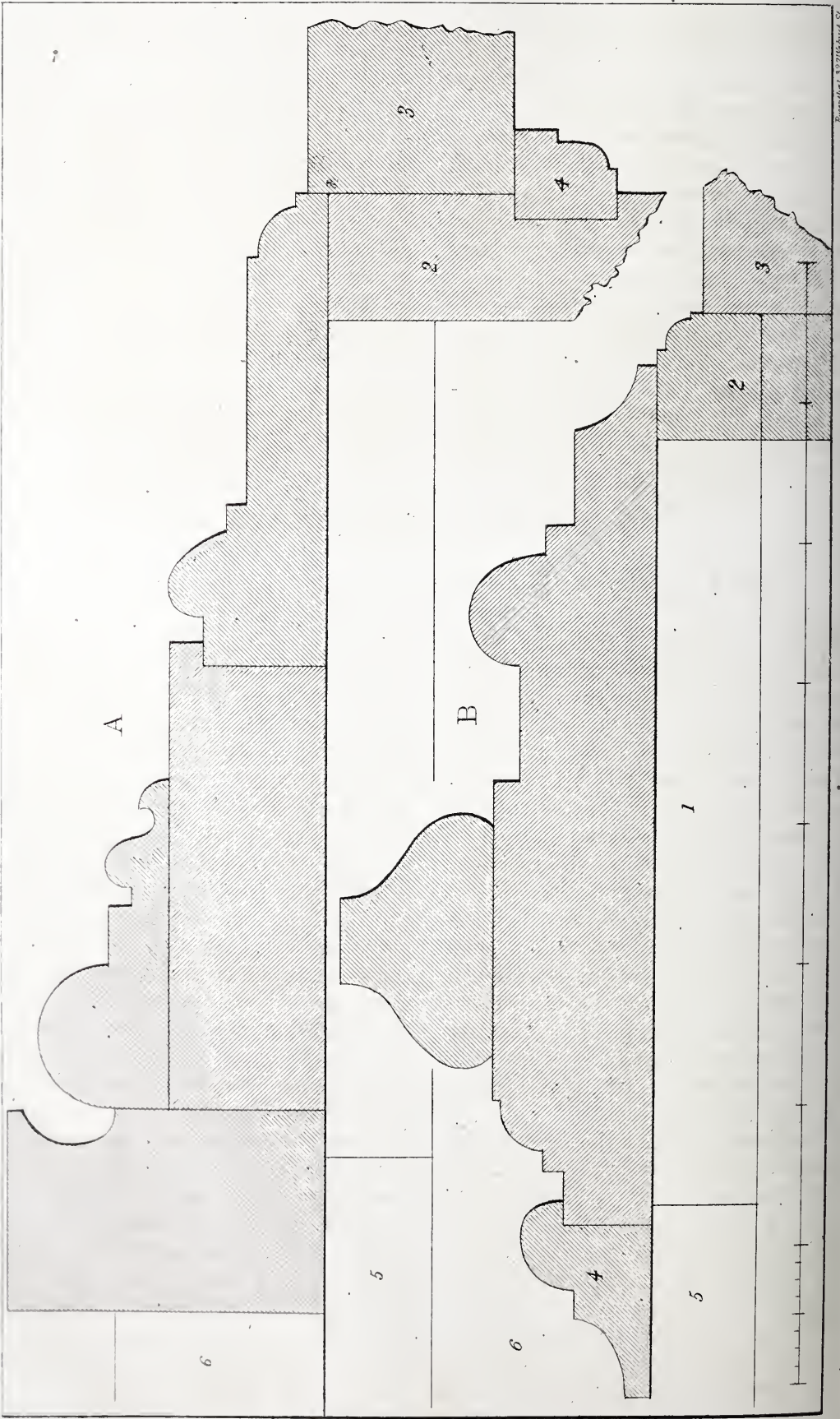
The principal rooms on this story are 12 feet high in the clear, and the kitchen is 9 feet; the laundry is the same height, being but one story.

CHAMBER STORY.—The bed-room over the kitchen is reached from the first landing of the principal stair case. On the upper or main landing of the second floor over the Drawiog-room, is the principal bed-room, to which a dressing-room is attached, having a side window, besides the bay on the front. Opposite this are two rooms with wardrobe closets between them, and at the rear, immediately over the butler's pantry, is the bath-room, and w. c. entered from the main hall; the main stairs are continued to a quarter landing, which is on a level with the third floor above the kitchen.

The materials used for the walls of the house, and for the greater number of the partitions, are bricks. The bricks are of three kinds, namely: the "common" bricks of the locality for the body of the external walls and for the partitions; the best pressed red brick, for the general work of the facing of the fronts; and the best Staffordshire blue bricks, for portions of the cornices and strings, (in lieu of those we would recommend the Milwaukee buff brick.) The facing work was neatly pointed in black mortar, and was afterwards pointed with white mortar, in each joint and bed in their projecting lines.

The partitions that are not brick are of timber quarterings, trussed where requisite and filled in with brick-nogging. A layer of asphalt is laid over one of the lower courses of brickwork throughout the area of the building. This prevents the rise of damp from the ground; to prevent the ingress of damp through the walls, all the external walls are hollow; each, in fact, is as two walls; one 9 inches and the other $4\frac{1}{2}$ inches in thickness, having a cavity of $2\frac{1}{2}$ inches between; thus making up a total of 16 inches in the thickness. The work of the external and internal faces of the





Two Designs for Architraves

whole is tied together by wrought-iron clips, of which there are two to each superficial yard of wall. All the flues are thoroughly coated to a smooth surface on the inside with mortar.

In the carpenters' work the timber is of the best quality, and in the joiners' work the materials are of pine. The windows have the ordinary arrangement for double-hung sashes. They are glazed with plate-glass, excepting the stair-case window, which is stained glass. The roof covering is of slate, blue and purple, disposed in various courses and in chevron-forms. The edges are curved with red tiles, having an ornamental cresting. The valleys are laid with lead.

The water decends externally from iron eave-gutters, by iron pipes; these are shown in the perspective view.

The house was originally contracted for at \$10,000, exclusive of grates and chimney-pieces, heating apparatus for the conservatory, and encaustic tile in the hall, which latter were produced after the house was built, and also required iron girders and stone flagging to carry the tiles, and some elaboration in the finish of the plasterers work. With change of material in the stair-case from pine to oak, and gas pipes throughout; with these additions to the original estimate the sum total would amount to near \$15,000.

TWO DESIGNS FOR ARCHITRAVES.

THE architrave is simply a collection of members forming a moulded frame around a window or door; and is of course, in accordance with the style of the building in which it is used. Thus, if the general style be Grecian, the architraves, as well as all other details of finish, must be of that style invariably. But, as to the order belonging to a style, such a rule does not interfere with the fancy of the architect. As, for instance, where the exterior of a building may be Grecian Doric, it is not in bad taste to have the interior finish of Grecian Ionic; and, should the exterior be of the Roman Ionic, it would be in perfect keeping to use internally, the Roman Corinthian order.

In observing this law of architectural composition, the student must bear in mind that his taste is free as to the treatment of his subjects, as far as the profile of the architrave goes, provided he strictly uses the members of the style involved, as we have said.

A and B, in the accompanying engraving are plans of two architraves. The figures in each corresponding with

the other: 1, the grounds; 2, the jambs; 3, the door; 4, stop-slip; 5, plastering; 6, the washboard. One of the most desirable objects in joining is the putting together, so as to break joint. Due attention must also be paid to the thickness of certain parts, where either stress or jar is likely to call for strength.

In the two examples here given the usual modes are shown. The stop-slip is rebated into the jamb. This is not as good a practice as we could recommend, which is nailing the stop on the solid jamb, showing a rebate on either side of it. This method we would have shown at B but for the want of room. Instead of the angle-bend on the jamb, we have given what we consider a better moulding, it being less liable to collect dust, and being more easily kept clean.

Architraves may be worked out of a solid piece of wood; but, such a course would entail a waste of both stuff and time. The best method is to glue them up in two or more longitudinal pieces, as may be judged most proper for the perfect combination of the parts.

The proportions of the architrave to the aperture or door-way are in ancient edifices, very various. The usual proportion in modern building is from one-sixth to one-seventh part of the opening. When architrave jambs are flanked with pilasters and consoles, the breadth may be one-seventh of that aperture; and the breadth of the pilaster two-thirds of that of the architrave. But, when unaccompanied by those pilasters and consoles, it ought not to be less than one-sixth part of the aperture.

A fashion prevails at present in the finish of first-class houses in our leading cities of inserting different sorts of wood, such as curled-maple, butternut, rosewood, cherry, etc. Such a practice is very pleasing in effect, when carried out with taste. But it is to be observed that, in case such a practice is followed it will be necessary to continue it in the base-board, or plinth all around the room, to retain the requisite unity of style throughout.

COMFORTS IN BUILDING.

THERE are many minor comforts in Domestic Building, which we even in this age of improvement, are but too apt to be inattentive to. Whilst exhausting study and contrivance on our compositions externally, so as to gain the good opinion of the outer world, how often do we architects, entirely overlook the little conveniences of the interior or family world; as though the general public were the chief party whose good will was to be obtained, even at the expense of our client's indoor happiness.

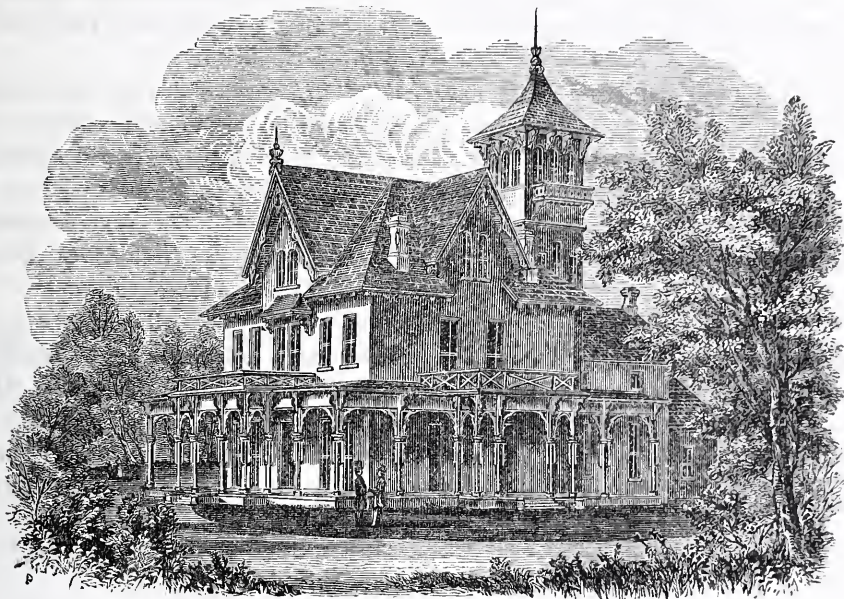
That this is altogether unjust and unnecessary, there can be no doubt. The dwelling is designed to meet the comfort and wants of those for whose enjoyment it is intended; not a mere passing enjoyment, such as the external spectator has a right to look for; but a life-long age, a series of life-long experiences of

comfort or discomfort which the inmates have to enjoy or endure, as the case may be.

A very common error in the arrangement of plans, is the neglecting to provide for the location of pieces of furniture. We once saw a house which cost the owner a round sum of money, in the parlors of which there was no place for a piano. We have more than once seen handsomely furnished bed-chambers, in which the bedstead of appropriate size, found no place save by intercepting the passage of a door which communicated directly with the dressing-room; or by blinding a window, the light from which could ill be spared. The happy introduction of sliding-doors, saves many a house from inconveniences arising from the crowding of doors back upon the furniture, or perhaps the total interdiction of necessary articles of furniture in the places most desirable for their location.

Our English cotemporaries are apt to misplace their kitchen, making the transit from that most necessary household department to the dining-room take in the principal hall, so that the dinner has to be paraded half through the house, winter or summer, to arrive at its destination. American architects invariably keep these two within easy reach of each other, and thus add much to the positive comforts of the house. But this matter is in a great measure governed by the customs of the country. With us the kitchen is not that degraded spot that it is in England, and we do not therefore, seek to avoid its proximity. Again, it is a presentable, not a repulsive apartment, and much care is bestowed upon its construction, finish, cleanliness, and comfort.

Still other matters, perhaps trifles in themselves, are wanted in our American houses, which would add many a happy feature to the home-life of our citizens, to which we will more fully refer in a future article of the ARCHITECTURAL REVIEW.



A COUNTRY MANSION.

OUR merchant princes are increasing in numbers; and fortunes that a few years back would have been considered fabulous are now undoubted facts, so numerous, as to cause our earlier ideas of personal wealth to shrink into insignificance.

Palatial dwellings for these millionaires form into streets in our cities, and are beginning to stud our rural districts with gorgeous retreats for their retirement, when the craving for more wealth is appeased, or the weariness of business toil at length compels the worn out slave to seek repose, to recuperate for fresher efforts of aggrandizement.

There is a minor class of these golden citizens, who, without being quite so favored of fortune, are yet as anxious for rest from exertion as the former, and they too seek their ease in the quiet beauties of a country home, and it is for this class that we have chosen to present this country mansion, which heads our remarks. It is in the style so often to be met with in parts of France and Lombardy, and is so treated as to suit the requirements of our country.

Such a design has been carried out at Lewisburgh, Pennsylvania, and Kalama, zoo, Michigan. In each place the location of fronts is alike, that is, the principal front facing the town, and the side looking towards the river. On each of these



fronts is a wide piazza, protecting the principal apartments from the heat of the sun on the east and the south. The

tower, which makes such a marked feature, affords a good prospect from its windows.

The plan of the principal floor may be thus described :

Entering at the hall door, we find on the right hand the Drawing-room, sixteen by thirty-two feet; and on the opposite side of the hall we enter the Reception Parlor, sixteen feet square, adjoining which, and communicating by sliding doors, is the Dining-room, sixteen by twenty-four feet. This latter has a china closet.

A short passage leads from the Hall to the Kitchen, and a door in the Dining-room opens into this passage. By closing the door under the main stairs, as well as the kitchen door, all the odors of cooking are effectually excluded from the front rooms.

The Kitchen, which is immediately in rear of the Dining-room, is sixteen by seventeen feet, having a range, sink, dresser, and all necessary fittings. A private stairs leads from it to the servants' sleeping rooms. Adjoining the Kitchen is a Scullery, in which there is an oven and boiler as well as a Smoke-house and a Larder. Here is likewise a range for summer use. In rear of the Scullery are the Wood-house and Wash-house, as well as the Larder, which is excavated six feet below the surface of the ground, having descending steps.

The Water-closets are in rear of the Kitchen, and are ventilated by the main flue of the latter.

The Tower is situated on the flank in rear of the Parlor, and at the junction of the main and back building. It is open on the first story, and forms part of piazza, separating the main piazza from the side one in front of Kitchen. It is carried up one story above the roof, and terminates with a curved canopy having wide spread or projecting eaves supported on skillfully wrought brackets. The upper story of this tower is lighted on all sides by triplet windows with circular heads. All the windows of the principal and

second stories have square heads, whilst those in the gable are, like the tower windows, circular.

All the windows of the main building are furnished with inside shutters. Those of the first story fold into soffits. As to the others they are fitted up in the ordinary way. The rear building has outside shutters to the first story, and blinds to the second story.

The walls are all constructed with brick, and painted on the exterior of a light tint usually termed "French Gray."

The eaves throughout are made to project at least two feet, having a moulded cornice on cantilevers to the horizontal parts, and pierced verge-boards to all the gables.

The whole roof is covered with slate, and has tin gutters and conductors.

The finish of the interior is plain and substantial, with hard wood to all the principal rooms on the first floor, including the main stairway. The residue of pine. The glass throughout the main building is French crystal plate, and the remainder American plate. All the kitchen fittings, including all the plumbing, are of the best and most improved kinds, and the workmanship very substantial. The plastering is all three coat work, the last of which is white in which pulverized marble is used, with the surface prepared for painting. All the principal rooms are fitted up with appropriate cornices, with centre-pieces in the Drawing-room, Parlor, and Dining-room. A centre flower in the hall ceiling.

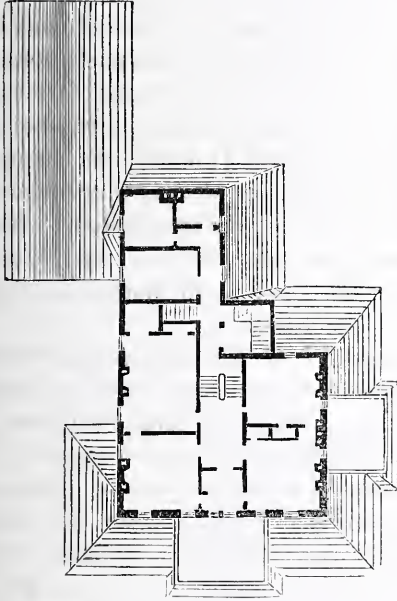
The exterior walls, and the two principal ceilings are furred out with shingling lath placed sixteen inches between centres.

The ceilings of the piazzas are lined with narrow milled boards alternated with different toned woods.

The hardware is all substantial. The door-furniture of the first story is bronze, and the rest is white porcelain. The painting throughout the exterior

is all done with three coats of best white lead and linseed oil, in light stone color. The part of the interior that is finished with pine wood, is done with three coats of pure white lead; and all the hard-wood finish, including the ceilings of the piazzas, is oiled three coats, and rubbed down to a smooth surface.

The second, or chamber story, is arranged as here shown.



The Attic is divided into four rooms. The entire cost of erection of such a house, built in accordance with the description here given, will be \$14,000; which estimate will of course be governed by the local market of materials and labor.

HATFIELD'S PATENT ROLLERS FOR FOLDING DOORS.—MESSRS. A. KENRICK & SONS, of West Bromwick, have submitted to us an invention, of which they are the licencees, for facilitating the movements of sliding doors, without liability to derangement, namely Hatfield's Patent Rollers for Sliding Doors. Its simplicity will certainly be no drawback to its use on the part of builders. The defective condition into which sliding doors are apt to fall, is ordinarily due to

the wearing away of their axles, evidenced by the difficulty of movement, the lower edge of the door closely impinging on the surface over which it was designed to slide lightly and easily; the closing, too, in such case, is almost uniformly defective, for the position of the door becomes necessarily deflected. The invention in question, which, we understand, has come into very extensive use in the United States, where all real mechanical improvements are seized on with avidity.

The axle, rolls upon a plane, and with a minimum of friction, neither grinding the bearing or itself, as must be the case when simply working in socket or husk; and as these bearings are free from any tendency to wear away, the door, secure in its position, cannot settle on the track or rail. The difficulty with many other appliances for sliding doors is in adjusting the true position of the wheel in the socket or husk; here the door, from the position of the wheel in the slot, rolls upon its bearings correctly, after having been moved once, to the end of the track and returned.—*Morgans' Trade Journal, London.*

A GREAT NEW YORK HOTEL.—The site of the old Lafarge House on Broadway, opposite Bond street, was sold in April, 1867, for \$1,000,000. A hotel is now being erected upon it, which, it is said, will be the greatest in the United States. The building will be an eight-story one, and will extend from Broadway to Mercer street in the rear. It is to have three high gothic towers, from which a fine panoramic view of the city will be had. There will be 600 rooms in the hotel, or 200 more than either the Fifth avenue or Metropolitan hotel contains. The dining-room will be 75 by 175 in size, and will seat 700 persons. The furniture and upholstery will cost \$400,000. The building and furniture will cost \$1,000,000 in all.

DESIGNS FOR BRACKETS.

THE accompanying plate exhibits eleven designs for brackets in varied styles, drawn to a scale of half an inch to the foot, and designed so as to be readily manufactured by the machinery now generally used for such purpose. No carved work is called for in any of those brackets, and hence their evident economy of execution. They are cut out of plank of several thicknesses, according to the required dimensions.

In joining, or laying together, the several thicknesses which are to form a bracket, it will be necessary to coat the adjoining sides or cheeks with white lead, to prevent the penetration of damp, and the consequent destruction by rot, which must ensue in case no such precaution were taken. Some use glue, but for exterior work the white lead is vastly preferable for obvious reasons. The following application may be made of the several designs of brackets here shown :

FIG. 1. Is a *cantilever* and *bracket* combined. It is introduced in all cases where there is an unusual projection of cornice, and also as a support for balconies and galleries. The core in this case is solid, being ornamented with raised ornaments as shown. A number of these ornamental sidings are screwed together, and cut out from one pattern by means of a gig-saw, worked by machinery, and so accurate as to be capable of following out the smallest or most intricate curve, with such accuracy and smoothness that nothing more is needed but a slight rubbing with sand-paper to prepare it for the painter. The front face of the bracket, when of considerable thickness, is usually fluted in accordance with the thickness, whatever it may be.

The drop on the end member is turned and spiked on, or secured by a dowel pin; and a diamond or other ornament

is usually stuck on the extreme face, as shown.

FIG. 2. Is a design of very simple construction, and is most generally used in Swiss, or in what may be designated as Bracket styles. This form is so consonant with frame-building that it is out of place in all other modes of construction. It is made in three parts, forming a triangle, the hypotenuse forming a strut or brace to those at right-angles with each other. It is usual to chamfer off the edges, as shown, this forming a very effective ornamentation. Stars, rosettes, or other devices, are fastened on at the three angle points, as shown in the engraving.

Brackets of this description are most applicable to covered ways, or roofed platforms, and are frequently seen at railroad stations. Such supports are used for roofs where posts or pillars are not wanted. That is, when the projection of the roof is not sufficient to admit of such posts, and is yet greater than the cantilever bracket would be equal to.

When used in verandahs, each of these brackets should be applied over the end of the brace, and form the support, as is frequently the case in Swiss examples.

FIG. 3. Is an ordinary bracket for cornices of moderate projection.

FIG. 4. Is a console. Their use is more particularly adapted to the support of arches, or cross-beams, and in fact they supply the place of pilasters, the projection of the shaft of the latter being often objectionable as occupying space which it is desirable to economise.

In internal finish, as in halls, it is a very desirable substitute for the pilaster, in as much as it will sustain the bridging-beam of the stair-way, or landing, without being an obstruction at the foot of the stairs as the pilaster would be.

Fig 1.

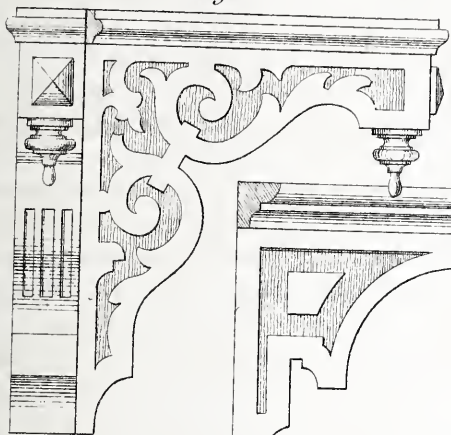


Fig 2

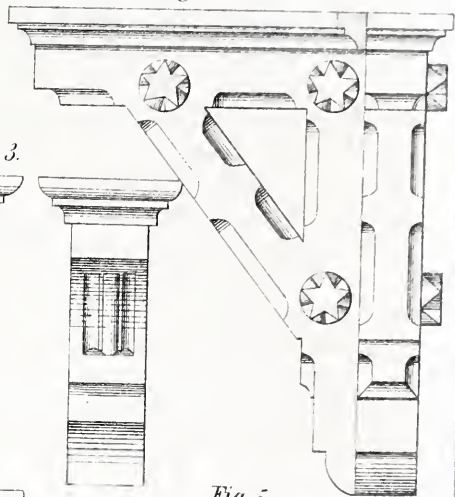


Fig 3.

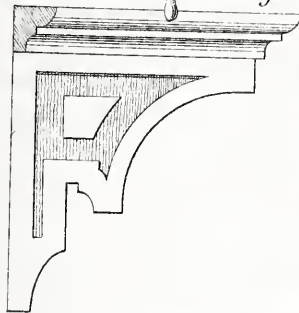


Fig 4.

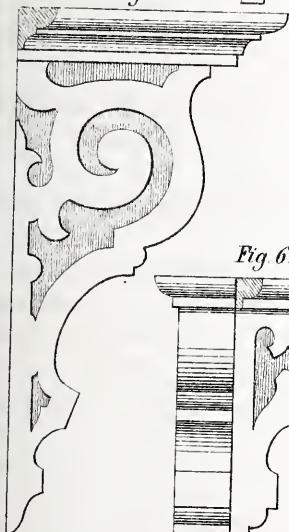


Fig. 5.

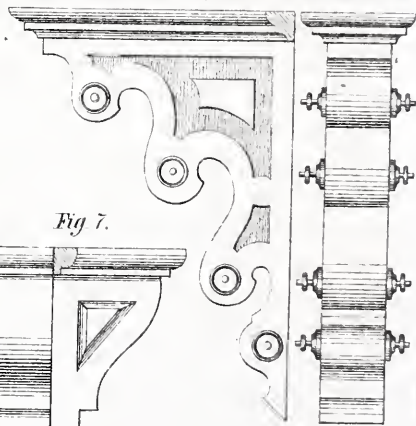


Fig 6.

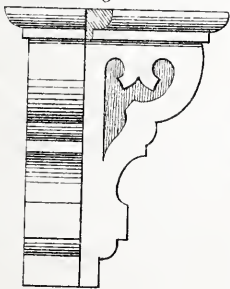


Fig 7.

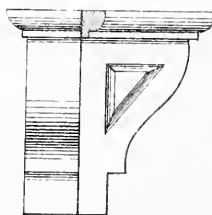


Fig 9

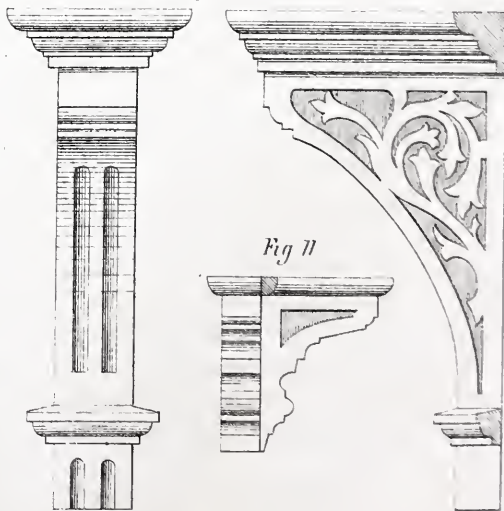


Fig 8.

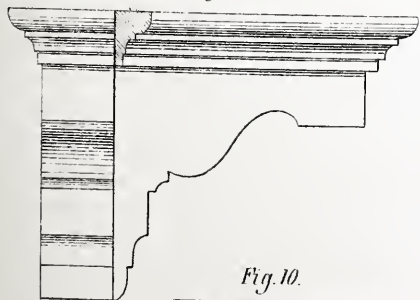


Fig. 10.

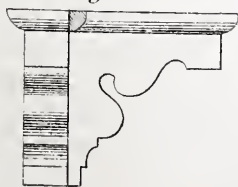


Fig 11

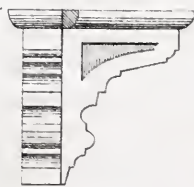




FIG 5. Is a bracket of a different design from those already given, being open at the core.

All the others, up to fig. 11, are designs of vari-form brackets for cornices, shelves, etc.

The taste of the Architect is at liberty to form very many designs of brackets, but in all there should be a prevailing feature of unity with the style of the building in which they are used.

There are few more attractive features in a rural composition than a neat well considered cornice, supported on brackets, alike suitable in appearance to the weight they collectively sustain, and to the general aspect of the design they are meant to ornament.

There is a certain law of propriety governing the distribution of brackets which, if infringed cannot fail of marring the intended effect. This law is as well understood by practitioners, from the influence it has over the mind, through the eye of the observer.

If, for instance, a certain cornice have too few brackets or supports, the over distance from one to the other cannot but be apparent. Where this separation is considerable it becomes desirable to couple the brackets; a practice which when well carried out, is unquestionably pleasing in itself. But, should coupling be had recourse to within certain limits, the opposite error is fallen into of crowding, which is as much a sin against good taste as that of paucity is an infringement of the laws of strength.

The introduction of iron has done much towards the beautifying of brackets; for, what could not be done in wood, or plaster, became readily and most reliably practical in the metal. This happy addition to art construction soon enlarged the limits of bracket designs, and, even now, new styles of floriated and highly ornate brackets are rapidly succeeding each other, so rapidly too as to threaten the deposition of wood from the throne it has graced for so many centuries.

A \$200,000 BUILDING FOR THE GERMAN WORKINGMEN.—The movements of the German labor and trades' unions are growing in importance from day to day, and their operations are continually extending, as will be seen from a project which has been set on foot lately. It is the projected erection of a workingmen's hall, or institute, on a grand scale. The matter has been taken in hand by the German Arbeiter Union, or Central Workingmen's Committee, composed of the delegates of the different German trades' unions and labor organizations in this city. A committee, to which the matter was referred, has just completed a plan of the building, which has been adopted by the Central Committee, and which will be submitted to a vote of the different unions.

The building is to be situated at a point between Houston and Eighteenth streets, and between Broadway and First avenue. The hall is to be one hundred feet deep, and is to extend over an area of four lots. The basement to form a large hall for mass meetings. In the second story will be located a ball-room, or lecture room, and in each of the upper stories there will be six meeting rooms, where the different unions will hold their meetings. The stores under the building will be used for co-operative purposes. The hall will be the property of the workingmen of New York, and will be placed under the management of the Arbeiter and Workingmen's Union. The cost of the building is not to exceed \$200,000, and is to be built in shares of five dollars each.—*N. Y. Times.*

THERE were about 1,000 houses built in Kansas City during the past season at an average cost of \$4,000 each, aggregating \$4,000,000. Of these about one hundred and twenty are business, and the others hotels, churches and residences, etc.

TWENTY thousand persons in New York live in cellars.

LESSONS FOR LEARNERS.

THE TUSCAN ORDER.

THIS very chaste and elegant order may be considered to have an independent nationality, apart from the Greek and the Roman, although adopted into the latter. It is entirely different from the Greek in its proportions and profile, and in this very difference we are inclined to see the primitive model for that reform in the orders which the Roman architects carried out with so much taste and effect, if not with all that peculiar dignity and severity which so naturally attach to the Grecian orders. The Roman Doric differs from the Tuscan, merely in the former having ornaments where the latter is perfectly plain. But the Contours are almost precisely alike; indeed, so much so as to suggest the idea of their identity as an order. In support of this view, it may be stated that no remains are to be found in Tuscany of such an order, although they exist in Rome. However, it is certain that Tarquin the First, who was himself a native of Tuscany (anciently Etruria), brought artificers from that country to Rome, and initiated that solidity and splendor which afterwards prevailed there; and as the Etrurians were well educated in Grecian Architecture, it is very possible that they modelled the Tuscan order on the Grecian Doric; and hence the name which even the Roman Architects knew this order by. Trajan's column is a fine specimen of the Tuscan, which even now the visitor to Rome may look upon and form his own conclusion as to whether it is of Greek origin or not.

We will not further discuss the question, but proceed to describe in detail this the first of the Roman orders of Architecture.

The Tuscan order is seven diameters high, that is, seven times its diameter at the base, which would make it fourteen

modules, or semi-diameters. The proportion of the Entablature is one-fourth of the height of the column, but if the order has a pedestal, which is seldom the case, it will be one-fifth part of the entire order in height.

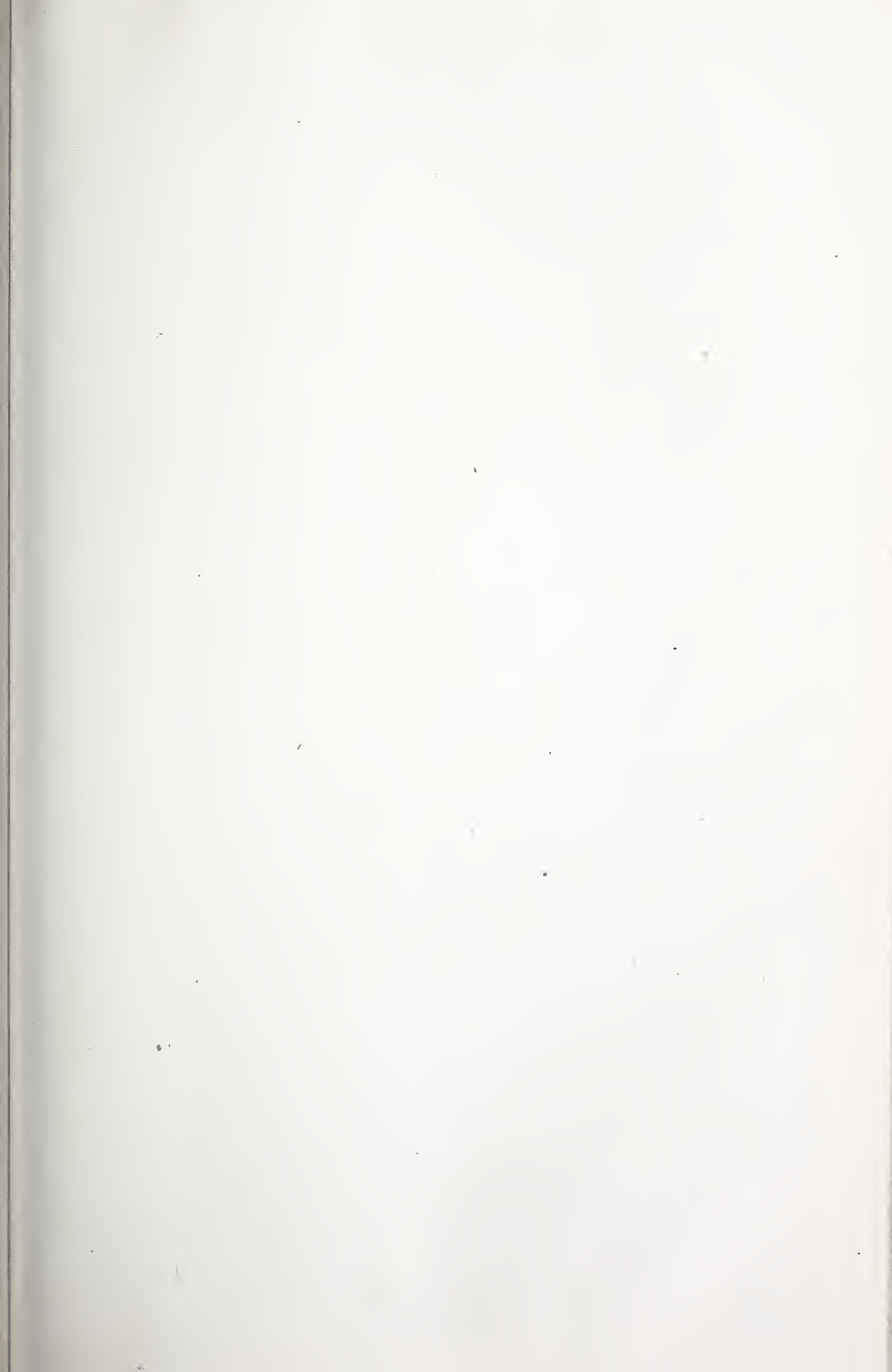
Therefore, divide the height of the column by seven, and the quotient will be the major diameter. One-half of which will be the module or scale by which the various parts are divided. At least, this last is the practice of Vignola, whose treatment of the order we give in the accompanying engravings. However, we desire to present all the opinions and practice of other authors—such as Sir William Chambers, Inigo Jones, James Gibbs, and others—which we will do in a critical form hereafter. At present our illustration is that of Vignola's Tuscan, which we find to be as follows:

For the *Capital* of the column then, commencing at the top, there is, for the fillet, one minute; the cavetto, one minute; the fascia, two minutes; the quarter round, three minutes; ogee, one minute; neck, three minutes; bead, one minute; fillet, half a minute; conge, one minute.

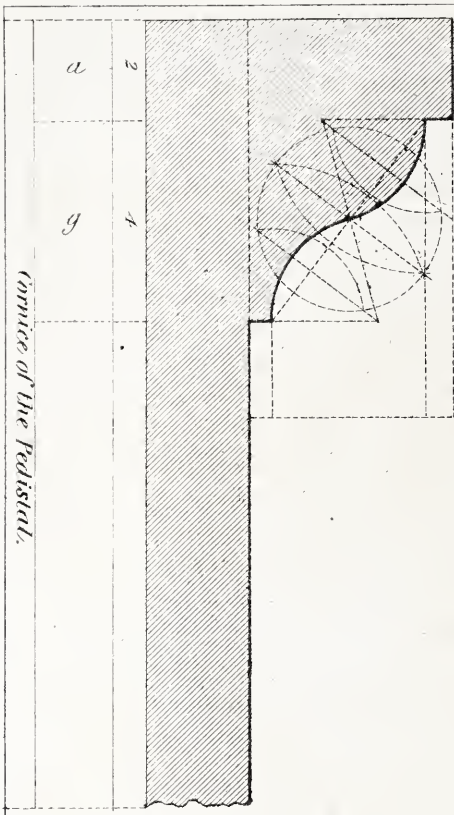
For the base of the column, plinth, six minutes; torus, five minutes; fillet, one minute; cavetto, one minute and a half. The pedestal has for its cornice, fillet, two minutes; ogee, four minutes. Then comes the die. It has for its base, plinth, five minutes; fillet, one minute; cavetto, two minutes.

The learner having first completed his scale can readily find all the admeasurements. And here, we may observe that Vignola takes all his projections from a line with the face of the neck of the column; or, in case of the pedestal, on a line with the die.

Other authors make the measurements from the line of the centre of the col-



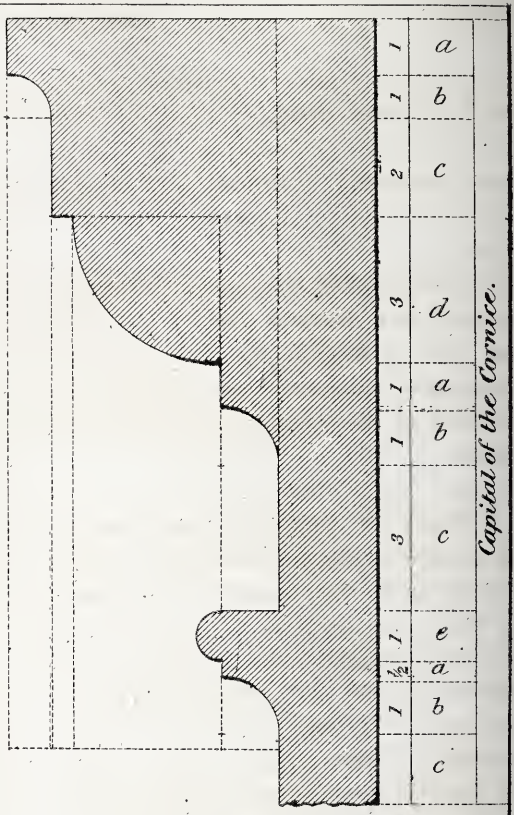
Cornice of the Pedistal.



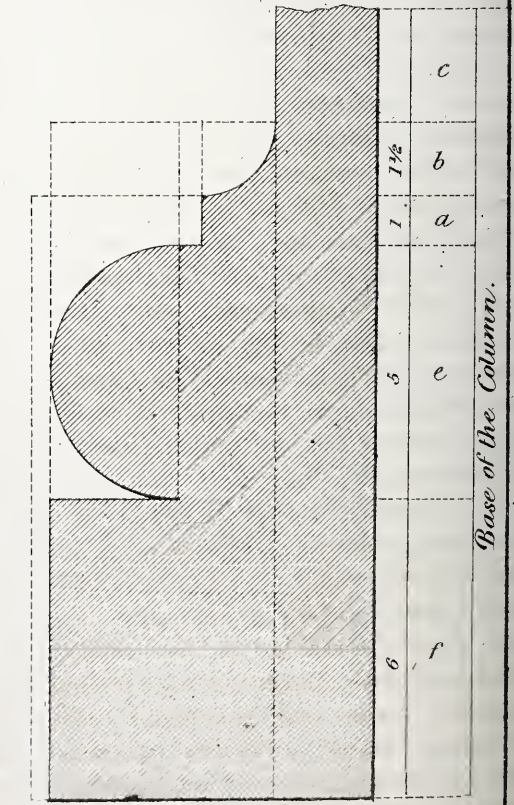
Base of the Pedistal.



Capital of the Cornice.



Base of the Column.



0 1 2 3 4 5 6 7 8 9 10 11 12 Minutes.

Details of Tuscan order.

Revised 32/10/1894

umn or pedestal. It matters nothing which of these modes is chosen ; whatever the place of departure for projections, however, it would be well to make the mode uniform throughout the whole order.

The learner will bear in mind that one minute is the thirtieth part of a module, and that a module is itself the half diameter of the larger end, or bottom of the shaft of the column, taken above the cavetto.

A WORK OF ART.—We have derived much pleasure from a visit to the attractive studio of Mr. GEORGE F. BENSELL, the well known artist, of this city, and were particularly attracted by the superb historic picture of *Esther denouncing Haaman*. We had seen this subject treated by other artists several times, but never so completely to our satisfaction as in the picture we now speak of. The prime defect in almost all conceptions of sacred scenes is that they are too theatrical, either in expression of *pose*, or in the effect of architectic surroundings. Purely imaginative treatment is not as truthful as the enquiring mind demands such illustrative lessons to be. We look upon the medley of pretty objects heaped upon the surface of a theatre's drop-scene with very much the same feeling as we view a kaleidiscopic display, that it is a pretty toy made up of impracticable compositions, dazzling the eye, but leaving no impression on the mind.

Mr. BENSELL's picture is happily free from such objection. Nothing can be more natural than the action of the whole scene. Esther, is, of course, the chief figure, standing in the centre, pointing with her finger at the trembling Haaman, whom she denounces with sternness, whilst evidently laboring under a feeling of fear as to the probable effect on the King of her bold action. The depicted rage of the monarch, and the terror of the accused, are alike most natural ; and each and every figure is

made to display emotions kindred to the one great passing event.

The accessories are admirably devised and painted. But what we particularly noticed was the studied fidelity to style, so evident in the display of local architecture. We feel doubly interested in the picture under consideration, in view of the wonderful affinity there is found to exist between the Assyrian style of architecture and that of its successor the Grecian, to which it is too evident to be doubted, it gave some of the models for the beautiful perfections of Hellenic art which have since given that glory to Greece which may never be dimmed or eclipsed.

In this fine picture we discern all those features of Assyrian composition which were so conducive to dignity of style, and the artist has evidently spared neither mind nor manipulation in working out details of which an accomplished architect might well be proud. Those tiles and painted bricks which so delight the antiquary are here shown in all the truth of sterling art.

The coloring too is in unison with the composition. In fact if boldness of conception, perfection in drawing, truth of comparison, and unswerving fidelity to historic reality, constitute perfection, then has Mr. BENSELL most assuredly triumphed in his effort.

Whilst looking on this grand work of art, we were painfully possessed of the idea that genius, like that which produced such a picture, should languish for want of that patronage which the abundant wealth of our teeming country should so freely provide.

There are few men of taste who have the means and the will to buy such works ; but there are hundreds having the means without the requisite taste, who yet have PATRIOTISM enough to foster the arts in our country, and uphold, in their most trying struggles for fame, the yearning workers at the easel, who are, by nature, too proud and too sensitive to beg for appreciation.

BIRMINGHAM SERPENTINE STONE.

THE Philadelphia *Press* lately gave the following excellent description of a very beautiful building stone, which we take pleasure in transferring to the pages of the REVIEW:

This stone is found in Chester county, a mile and a half from the Street-road station, on the West Chester and Philadelphia Railroad, and near the Friends' meeting-house of Birmingham, from which it derives its name. It is claimed for this serpentine that in addition to being a non-conductor of heat it combines many other desirable qualities for building purposes.

THE OTHER SERPENTINES

In this portion of the State occur in ridges, parallel, or nearly so, to the general course of the Alleghanies, from northeast to southwest. The Birmingham deposit, on the contrary, is an isolated knob, elliptical in form, the long axis being east and west, at a distance of more than four miles from any distinct ridge. The knob rises about a hundred feet above the stream at its base, and covers an area of about six acres, thus furnishing a large supply of this building material.

SEVERAL PECULIAR MINERALS

Are found in the Birmingham serpentine. Among them are clinochlore, chlorite, asbestos, a limited amount of hydrated silicate of magnesia (the true *meerschauum*, used for tobacco pipes), and many others.

As would naturally be expected from this, the serpentine itself of this locality presents unusual and characteristic traits, and they are such as adapt it admirably for building purposes. Its prevailing color is a light, cheerful, permanent green; its texture is very uniform, and firm; it occurs in large masses, some having been taken from the quarry eight to ten feet in length, and three to four feet in thickness; and

is quite free from any mixture of iron or flint.

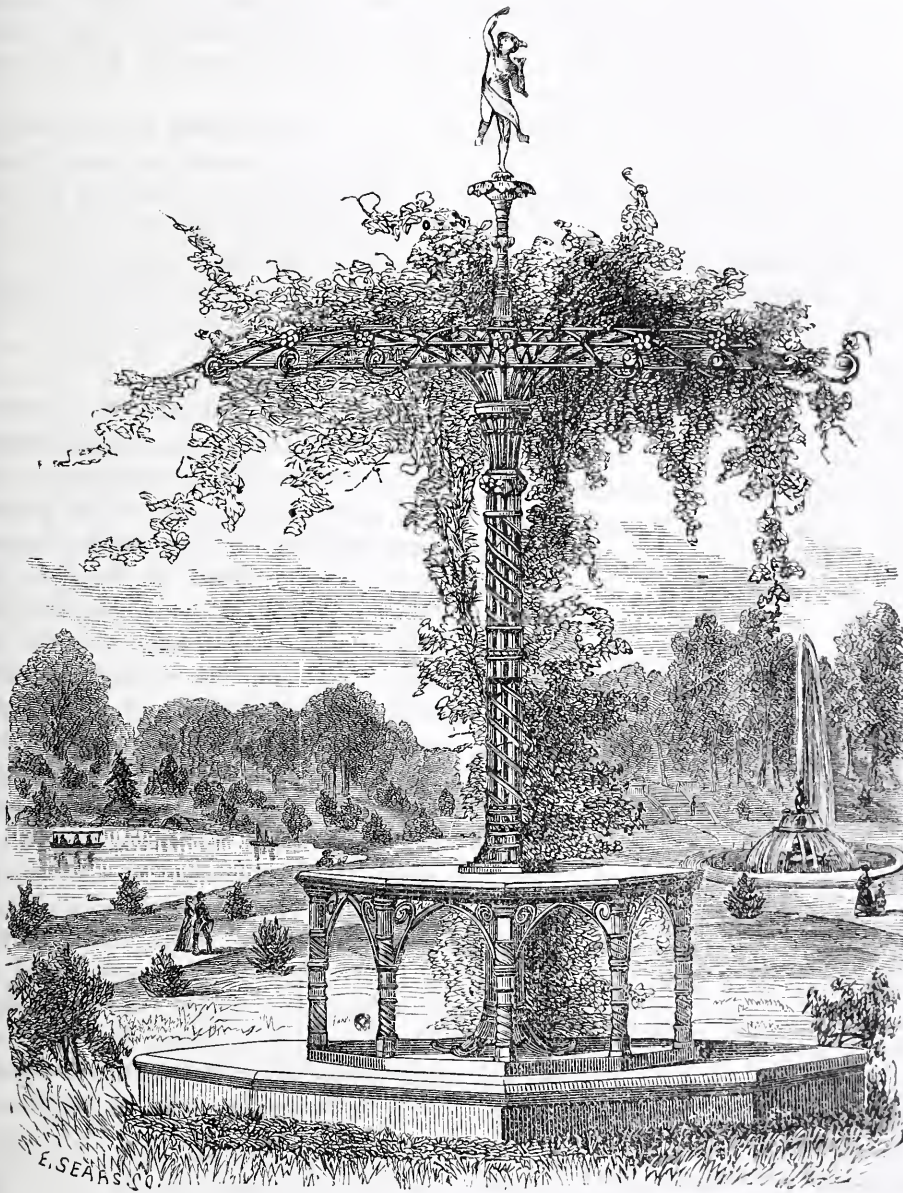
ITS PERMANENCY.

When first quarried it is so soft that it can readily be turned in a lathe, or cut in any desired form. Soon, however, it hardens, and then no exposure to water will soften it, as when the silicates held in solution by the "quarry water" once crystalize, they become entirely insoluble. It will then bear a fine polish. These properties suggest its fitness for interior decoration, and for rich exterior designs.

THIS SERPENTINE

Has already been used in the construction of many handsome dwellings and church edifices. The new church at Broad and Spruce streets is built of this stone, and is one of the finest structures of its kind in our city.

HOW A PALACE IS LIGHTED.—It is said that one of the European palaces burns ten thousand wax candles nightly. The candles are put in their places and connected by a web of gun-cotton, which passes from wick to wick. When one end of this chain of gun-cotton is lighted it flashes instantly from one candle to another, and all in the room are lighted at once. The gun-cotton is prepared with some kind of perfume, and at the time it burns an agreeable odor is diffused in the room. That will do very well for a place where candles are burned, but in some of the large halls in New York which are lighted by gas, all of the hundreds of burners are lighted by electricity. A fine wire, so small as not to be noticeable, passes from one burner to another, and is so arranged as to give a minute spark at each. By a single movement of a key attached to the electrical apparatus, the gas throughout an immense hall is lighted "as quick as a flash."



GARDEN SEATS.

THERE are many beautifying objects which add to the ornate effect of a garden or pleasure ground, but few which combine utility and appearance, in so eminent a degree, as the ever welcome place of rest where, when the body is fatigued in the pursuit of pleasure, the mind can still be gratified with its charming survey of inviting elegances of art, or the never failing efforts of nature.

This illustration, of a very ornate and graceful sheltered seat, is taken from the *Horticulturist*, a publication which is always embellished with the choicest flowers of nature and art, and about the name of which memory has interwoven, in fadeless evergreens, the name of A. J. DOWNING, whose taste and ability have added so much to the progress of domestic architecture and horticulture in this country.

THE WISCONSIN CAPITOL.

[Correspondence of the Chicago Post.]

"A pleasant ride of about six hours, on the Chicago and Northwestern railroad, will bring the traveler, as it did the writer, in good order to the capital of Wisconsin, the beautiful "City of the Four Lakes," as the noble red men used to call it. That dusky nobility have fled to regions where the scalping knife can be exercised without so much inconvenience, but they have left the four beautiful lakes, and their transparent waters, The varied landscape around, the attractiveness of public and private buildings, and the abundance of foliage, natural and transplanted, combine to make this perhaps the most beautiful inland town in the West. This seems to be the sentiment of many who, having the misfortune to be engaged in business in St. Louis, and other unhappy villages along the Mississippi, seek refuge from the summer heats by coming here at that season, some of them owning very fine country residences on the borders of the lakes.

"The mosque of Constantinople, the dome of St. Peters, the Capitol of Washington, the Temple of Brigham Young, are the distinctive landmarks which identify their respective localities for long distances around; and so the new State House at Madison, whose huge white dome just completed, looms up conspicuous for a score of miles is the distinguishing monument of this city. It is some twelve years since the new building was commenced. Active steps for its completion, however, began four years ago, when S. V. Shipman took the architectural charge of the great work, and the massive and well-proportioned stone walls, and lofty and graceful dome, now stand as proud evidences of his skill.

"The cost of this dome is but \$90,000. It is strong enough to withstand all the tempests that blow, and makes a noble landmark, When illuminated at night

by rows of gas jets, which will be simultaneously lit by electricity, the effect, both within and without, will be very fine.

"The entire building cost only about \$600,000; and considering that Illinois will probably pay \$4,000,000 for her new capitol this it will be seen is an old fashioned economical expenditure."

[A full and detailed description of this building is in preparation.—Eds.]

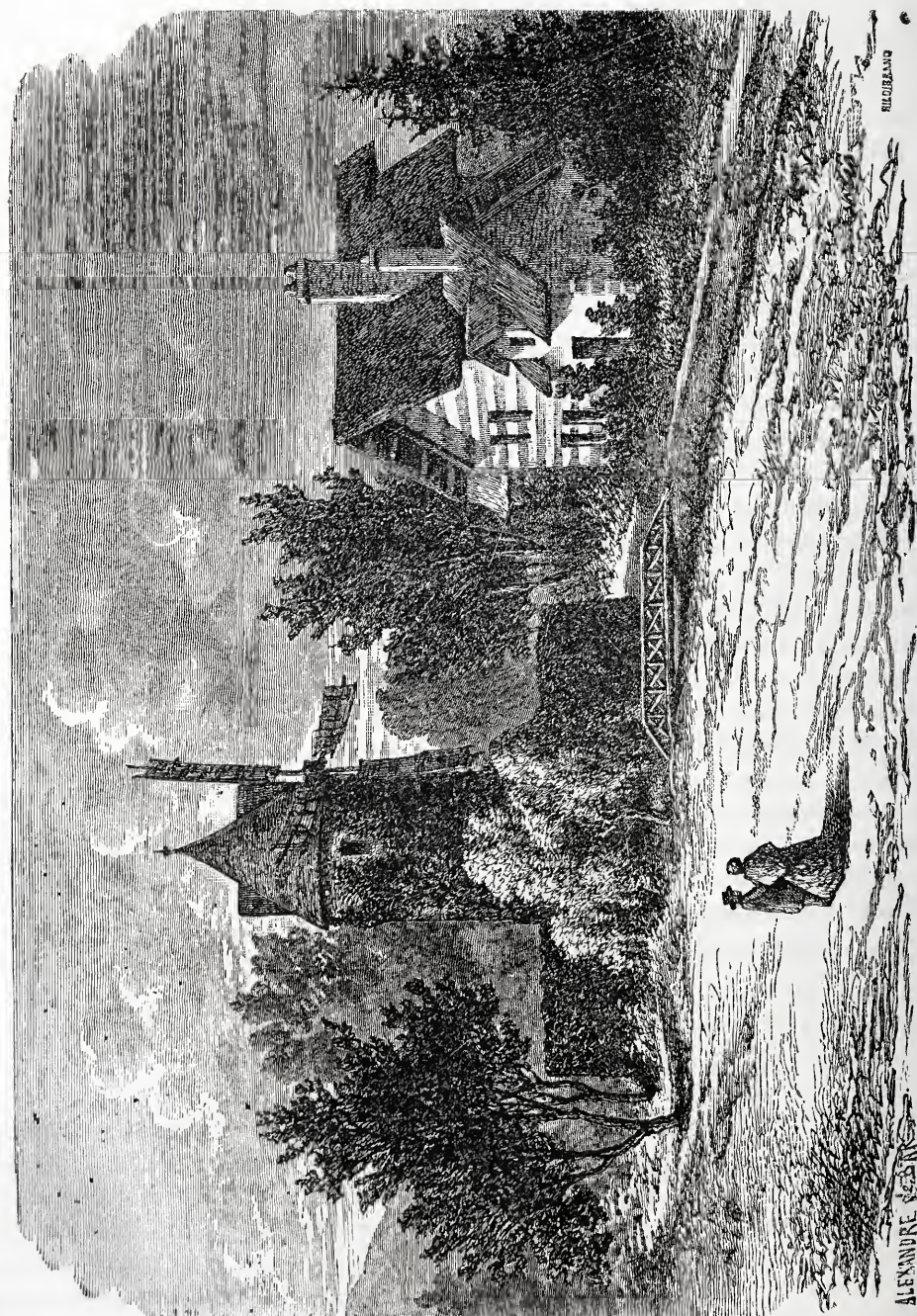
TRAFFIC MANAGER N. S. W. RAILWAY.

At a meeting of the Executive Council, by resolution, Mr. R. Moody was appointed traffic manager to the government railways, the office having become vacant by the death of the late Mr. Owen. Mr. Moody has been the chief clerk in the department for the last twelve years, and the intimate acquaintance with the details of our railway management, together with the large experience he had acquired antecedently, seemed, in the opinion of the Commissioner (the Hon. John Sutherland), by whom the appointment was advised, to indicate the possession of special qualifications for the office. It is thought that Mr. Moody's appointment to the position, which is one of considerable importance, will prove highly advantageous to the department and satisfactory to the public.—*Sydney Herald*.

THE Sunday-school chapel, erected by the First Church in Pittsfield, was dedicated on the 28th ult., the exercises taking the place of the regular afternoon service. Introductory by Rev. Dr. Strong of the South Church; sermon and dedicatory prayer by Dr. Todd. The building cost \$21,000.

THE new meeting-house of the Congregational church at Grand Rapids was dedicated November 28th. Sermon by Rev. Wm. D. Love of Milwaukee. The building is of brick; is finished in butternut and black walnut; will seat over 1,000 person; and cost \$65,000.





ABBEY OF LONGCHAMPS.

THE BOIS DE BOULOGNE.

[ABBAY OF LONGCHAMPS.]

THE picturesque appearance presented by the mill and its accompaniments, as displayed in the beautiful engraving we have selected for this number is from the splendid French work now being published by Monsieur J. ROTHSCHILD, of Paris, of which we have already spoken; but, of the merits of which we can scarcely say too much.

The abbey stands in the plain of Longchamps, at its union with the Bois de Boulogne. That is to say what remains of the venerable structure, to which so many historic memories attached. A tower used as a wind-mill, which had so far yielded to the assaults of time as to become more picturesque than useful. In virtue, however, of the link it represented in the chain of historic memory, it was determined to restore it, to the extent of rendering it available as a wind-wheel tower, to be used for the raising of water to the reservoir which now supplies the grand cascade.

The old abbey was originally founded in the thirteenth century; and the platform, and what is still left of it, is covered with ivy, producing a very pleasing effect. The custodian of this wind-wheel tower occupies a pretty cottage, erected on the ruins of a former house which had fallen into decay. The present rustic residence, as seen in the illustration, adds much to the interest of the subject, with its neatly thatched roof, and its walls pierced with pleasant looking little windows, filled with lead-light casements, in humble imitation of those to be seen at *le petit Trianon* in the park of Versailles.

The stream of water seen in the view here given, is the overflow from the supply pump which is worked by the wind-wheel.

It requires some strain of the imagi-

nation, on the part of a stranger, to comprehend the connection between the present mill, or water-wheel, and its accompanying dwelling, with the old time Abbey of Longchamps, yet the odor of history, in its undying power, still rests upon the favored spot, and every Frenchman reverences the past through the apparently irrelevant structure of the present.

But, apart from the national feeling with which it is imbued, there is a certain suggestiveness about this very picturesque spot, which at once attracts the observer, and wins, if not his admiration, at least his sympathy.

The Abbey of Longchamps was formerly contained in the Bois de Boulogne, and was a celebrated place of pilgrimage. Whatever may have been the benefits it conferred upon society in its religious calling in its day, there can be no question regarding the pleasure it gives now, in supplying water to the most charming artificial cascade in the world.

The supplying power is composed of four pumps placed at the base, to which the waters of the river Seine are conveyed, and by them, through the instrumentality of the wind-wheel which we see in the illustration, is forwarded to its destination, the cascade.

A GENUINE Yankee, at Lisbon, Ct., who wanted to put a water pipe through a drain several feet below the surface without digging up the drain, tied a string to a cat's leg, thrust her into one end of the drain, and giving a terrific "scat!" the feline quickly appeared at the other end. The pipe was drawn through the drain by means of the line, and an expense of ten dollars saved by the operation.

OILING BROWN STONE.

IN view of the exfoliation of brown stone, we foresee the inevitable unpopularity of that so long favorite building material, and as it is desirable that any information which can tend to the prevention of the destructive influence in question should be made known, we would call on those who feel at all interested in the subject to give their opinion freely. Discussion aids knowledge, and the more we sift the proposed cures and preventions, the more certain are we to arrive at that which is really worth retaining. Mr. T. H. Rilley, of New York city, in a communication to the *Scientific American*, published in the issue of that excellent journal, dated January the first, gives his practice as follows:

"Being a practical painter, it has been my lot to oil some of the best fronts in New York, namely, corner of Twenty-third street and Fifth avenue; No. 2, West Twenty-third street, also No. 1, West Thirtieth street; also the residence of E. S. Higgins, the carpet manufacturer, done by other journeymen.

"They were very dark in color for a few weeks, but, now after two years, they are bleached almost as light as they were at first.

"These fronts were cleaned whenever necessary, and then oiled with fresh raw linseed oil from the press, put on pretty much as carefully as in ordinary varnish work. No second coat or lapping over of the oil. All was put on at once that it would take without running down in streams.

"The result: the oil penetrates into good dry stone, probably $1\frac{1}{2}$ inches, making the stone hard and flinty, as any stone cutter will soon find out if he tries to trim it.

"It keeps the damp and therefore the frost out of the stone, as will be seen any foggy day, the damp running down in streams on the oiled stone, and the unoiled stone absorbing the dampness.

It is therefore necessary to oil during dry weather. The oil is especially beneficial to balustrades and carvings, as they are generally got out of soft stone. It is also beneficial underneath balconies and porches, as the sun never has a chance to dry the stone in such situations before the frost flakes it."

We have two objections to this mode of treatment—the one is that oiling is expensive, and the other is that the oil is drawn out by the action of the sun, after a short time, and therefore requires renewal.

The preparation of silicate of soda (soluble glass), as well as its application, may meet the requirements of facility of use, and permanency of prevention. As to economy, we would say that it is involved in these latter.

Coating the backs of the brown stone slabs used for facing, with cement, is an easy as well as economic practice. It prevents the absorbed moisture on the front passing much further than the surface, and therefore gives a fair opportunity for the quickly drying out of the stone by exhalation.

INTERESTING DISCOVERIES.—The Saxon architect, Ernest Ziller, has been so lucky, while conducting some excavations in Athens at his own cost, as to light on the site of the situation of Lycurgus. This is the most important archæological discovery that has been made since Strack, of Berlin, had the good fortune to find the Theatre of Bacchus in 1862. The King of Greece, having visited this interesting spot, has resolved to continue the work of disinterment at his private expense under Ziller's inspection.

THE Baptists of Louisville, Ky., are building an imposing church edifice in that city.

FINE ART ARCHITECTURE.

AT the late commencement of the London Architectural Association, the following remarks were made by the President in his address :

* * * * * "The fine-art architecture may be shortly defined as the art of superadding beauty to that which is useful. Man needs a building that therein some special object may be performed. Art-architecture enables him to make it beautiful. In the Middle Ages, a bishop wanted a building where men might meet in crowds to do honor to their God. The architect proportioned the parts thereof that it might be beautiful. He vaulted the roof, moulded the arches, carved the capitals. He made windows for light, and gave them beautiful forms. He glazed them as a protection from the weather, but he painted the glass for beauty. He wanted more color; so the painter brought his art, and there he told his wondrous tales. There were doors, which the sculptor beautified. There were towers for bells, and these the architect grouped in lovely outlines; and a cathedral was built. Now, as in the building itself, so in each detail, we find first a requirement supplied, and then beauty incorporated in the work by the art of the architect; and this operation of combining utility with beauty is not confined to buildings, or even to the details thereof, but finds a field for its exercise in every kind of manufacture. The constant presence of wants to be supplied, while it is the groundwork of all true styles of architecture, and the great hindrance of all styles that are false, is the very reason for the existence of all industrial manufactures. A constant view to utility and a true love of beauty are the requisites alike of the architect and the designer of manufactures. Their art is identical; it is, in fact, the one great art-architecture that governs the whole. It is important to establish this, because many who enshrine architecture in the

academic circle of the fine arts—with painting and sculpture—are surprised when asked to regard some common thing of daily life as a work of fine art. The furniture, the tapestry, the pottery, the glass, the dress of everyday life, are as capable of receiving art-treatment as buildings themselves. When in times past building has flourished, the art in these things has flourished too; and when architecture declined, first one manufacture and then another fell under an artless tradition. Think not that in thus claiming an extended sway for architecture, I am anxious to increase the province of architects. Speaking generally, it might be said that when art most flourished we heard least of architects. It is as with the saints of ancient times—when the world was most wicked then they most abounded, and their deeds stood out in high relief, whereas in the general decency or appearance of modern days the character is unknown, or at least unrecognized. In some respects the existence of architects is abnormal, for surely each man should be the best designer in the branch of art in which he works. In buildings, however, where so many arts are brought together, a chief is indispensable; and at this period, when all the subsidiary arts have fallen into a state of decadence, in which each is inconsistent with the others, some race of men who will study abstract design may well be tolerated. My object, therefore, in setting forth the close connection, or rather the identity, of art in buildings and art in manufactures, has rather been to remind us of the Architectural Association, on the one hand, that the result of our studies must be to establish principles for an art which shall be applicable not in buildings alone, but in all manufactures, and to claim on the other hand that the true principles of architectural art shall govern all works of industry. If this is to

be so, it is manifestly useless for architects to stop short at 'the five orders,' or the forms of this or that century. With these things art in industry has nothing to do. We find, however, common ground at once when we turn our attention to beauty of outline, grace of proportion, harmony of color, and the laws, now constantly neglected in manufactures, which makes ornament artistic. A constant view to utility is, however, the greatest bond of all. By it, character or style is imparted to an object (be it building or manufacture) in such a way that the very expression of use becomes a great source of beauty. I will illustrate what I mean; and first, negatively, from a building. Let me remark that I give no opinion on the building, which, in fact, I have not seen; I only use it as an illustration. During the past year a market has been erected, with extreme munificence on the part of the donor, at the east end of London. You may possibly remember that in the descriptions of Columbia Market which appeared in the daily newspapers at the time of opening, certain decorations and parts of the building were spoken of as 'ecclesiastical.' Now, the character of the artistic criticism which appears in non-professional journals is such that it is quite possible this word may have been used to express the forms of a style of architecture which was just as applicable, and just as much used in civil and military buildings, as in churches; and, if so, all may be well. If, however, any features or decorations did really suggest to intelligent minds that they would be more appropriate in a church than a market, than such features and decorations were worse than useless; they tended to destroy the character of the building—they made it less fit for a market, and were sins against the laws of artistic utility. Now, let us turn to a common article of manufacture; and I must ask you to excuse its extreme familiarity, because it adds to its value as an illustration. Take an ordinary

table-knife. It is simple enough, and, at first sight, you will say useful enough. Now, you will remember that it has constantly to cut things laid down on a plate, and that one part only of the blade, a part near the end, is ordinarily brought into play. That the work comes almost entirely on one point may be seen at once by looking at knives that have been long in use. This fact, however, never entered the head of the designer of the knife, or, at any rate, he disregarded it. Take next an old fashioned table knife, such as still lingers among the inhabitants of old country houses. First, we find a long sweep given to the point, at which the cutting ordinarily takes place, to lengthen the point on which the work comes. Then we find the point strengthened with additional metal; we find a place provided for the forefinger, and a knife produced which, while it is quite as useful for such purposes as cutting bread as any other knife, is characteristically and essentially a table-knife. It is far more utilitarian than the other, for it will far longer endure the special work for which it is designed; and it is a work of art, for it displays throughout, and has given its designer the opportunity of introducing, graceful curves and outlines. In the first case we have a work which satisfies a simply utilitarian age; in the second place, we have more utility, with character and expressed purpose, with thought, and art. I insist on this quality—this derivation of the art from the use—because in this rests the only hope of associating the practical utilitarianism of the age with art. By this only can we hope to persuade the commercial man of 'per cent.' to entwine art with his manufactures. By this only can we hope to arouse a lethargic public, and to persuade them that architects are something more than antiquarian pedants, and architecture something more than an obsolete amusement. Now, if our art of architecture may be thus legitimately extended in to every manufacture—if it

should constantly intertwine itself with everything that is useful around us—have not all of you, even those who have least connexion with the architectural profession, some share in the matter? and have we not been justified in asking you to listen for a few minutes? We ask you to share with us our position as artists, and in the common things of daily use to be patrons of art. Think not you can even see those arts which you may consider (and perhaps to some extent rightly) the noble arts of painting and sculpture in perfection, if art be wanting in minor things. This is impossible; for both public taste and the minds of the artists will be perverted by the ugliness of their ordinary surroundings. It would not be difficult to show that at the present moment painting suffers under a fearful incubus, while sculpture has been brought to the verge of annihilation, from the want of artistic character, and from the intrinsic ugliness of the costume worn by the men of this generation. We ask, therefore, the sympathy of all in promoting the welfare of our art. That it is a good work for you to help in, we doubt not; the government of the country says that it is a good work, for it establishes museums and schools for instruction in art. We believe art to be a blessing, because it can soften the too stern realities of life; because it can shed one bright beam over the daily toil of the workman; and because it can make both the worker in art and him that appreciates it advance one small step towards the nature of the Great Creator, who, in the simple allegory of the earliest of prophets, is represented as reviewing all that he had made, and ‘Behold, it was very good.’”

An advertisement in the *Sydney Herald* intimates that the negotiations between the government and the committee of the Australian library have not yet been broken off. A meeting of the shareholders is called to consider a proposal from the government to purchase the

books and rent the building. This would make a commencement with a free library, while the government would only continue to occupy the present premises till the new national library was constructed. It remains to be seen, however, whether the shareholders are willing to exist as a corporate body simply in the capacity of landlords.

The Colonial Architect, it is to be presumed, in accordance with instructions, has prepared plans for erecting a National Library, on the vacant land adjoining the museum. The new building recently erected there only covers one portion of the land, and was originally designed with a view to extension. In some future generation the whole block will probably be wanted for the purposes of a museum; for in these days of scientific collection and classification, the treasures of the museum accumulate with enormous rapidity, and fresh room is scarcely provided before it is crowded with glass cases and specimens. But for the present, at least, plenty of room can be found both for books and specimens under the same roof. For scientific students it will be convenient to have specimens and books accessible close to each other; though, perhaps, for the majority of those who will frequent the library this is not a matter of much importance. The site will give a good display to the architectural character of the building, and though not in the centre of a dense population is easily accessible from all parts of the town. Although ministers have in hand an unrepealed grant of £20,000 for the purposes of a public library, they will probably abstain now from any definite action until Parliamentary sanction has been obtained to their proposal; and the more so as the full development of Mr. Barnett's scheme will cost at least £100,000. But we may, possibly, this session, make a beginning with something, and make an effective, though it will be a tardy movement in the direction of a free national library.

REMOVAL OF HOTEL PELHAM, BOSTON.

THE Boston *Daily Advertiser* gives the following highly interesting article, prepared by the superintending Architect, and therefore reliable. We need offer no apology for presenting it in full:

"As the moving of this large building has attracted much attention, not only in this city, but throughout the State, the country and in Europe, several of the English, French and German papers having given accounts of it, none of which were correct, and as constant inquiries are being made for a description of how the work was performed, we have carefully prepared the following history of the undertaking.

"On the 23d day of July, 1868, the Board of Aldermen passed an order to widen Tremont street, on the westerly side, making it sixty feet, which necessitated the cutting off or the removal of the Hotel Pelham. The committee on streets, who had the matter in charge, caused estimates to be made as to the amount of damage for cutting off, and also for the cost of removal, and the latter was found to be decidedly the most economical; as there were doubts, however, in the minds of many, of the possibility of moving such a structure safely, the committee asked the opinion of several persons considered experts in such matters, who gave it as their judgment that it could be done successfully *if proper care and skill were used.*

"It must be admitted, however, that there were others, of equal standing, who gave an opposite opinion, and the public generally agreed with them. The city having the power to cut a building off, but at that time not any power to move it without the owner's consent, negotiations were entered into with Dr. John H. Dix, the owner, which resulted in an agreement giving the city the right to move it back to the new line of Tremont street, they making good any and

all damage caused thereby, and that the work should be performed between the first of May and the first of October, 1869, the city to deed him the adjoining lot on which it was to be moved, and also to free the hotel building from any betterment on account of the widening. At a meeting of the committee on streets, held April 7, 1869, Nathaniel J. Bradlee, architect, of this city, was appointed agent of the city to have the entire charge of the undertaking. Soon after Mr. Bradlee's acceptance, he selected Mr. John S. Blair, superintendent of moving, and Mr. John W. Leighton superintendent of masonry.

DESCRIPTION OF THE BUILDING MOVED.

"The Hotel Pelham is situated on the southwest corner of Tremont and Boylston streets, and is what is commonly called a freestone building; that is, the two principal fronts are faced with Connecticut freestone, backed up with brickwork from twelve to sixteen inches thick, and the other walls are of brick. There are two brick partition walls running from north to south, but none of the partitions from east to west (the direction in which it was to be moved) go through, though there were three extending from Tremont street to the first division wall. The side of the building is not at a right angle with the front, but the cross partitions are at right angles with the side, and are therefore not parallel with the front wall, thus increasing the difficulty of moving.

"The hotel was somewhat irregular in its exterior, covering about fifty-eight hundred square feet of land, having a frontage on Boylston street of sixty-nine feet, on Tremont street of ninety-six feet, on its southern line of sixty-two feet, and on the western line of eighty-eight feet, with a break on the southern side of four and one-half feet, and on the western side, of three feet. The

front wall on Boylston street was supported on eight massive granite posts twelve feet high, four of them four feet square, the others three feet square. The Tremont street front had, in addition to the corned post, two similar piers, and the remainder was built up with rough block granite filled in with chip stone, and so poorly constructed that it was thought best to tie it thoroughly together with iron rods and timbers.

"The Tremont street face and the south wall were cracked in several places owing to carelessness in its original construction.

"Paper was carefully pasted over these cracks to see if they increased, but no change could be discovered after the removal.

"The basement or story below the level of the sidewalk is occupied for storage, heating apparatus, fuel, etc. The ground floor for shops, offices and entrances to the apartments over, and the six floors above are arranged in suites of rooms for the occupation of families, there being seven stories above the sidewalk. The total height, from the level of the tramways on which it was moved, is ninety-six feet, and the weight of the whole structure was estimated by a careful calculation at five thousand tons, without the furniture or other articles which remained in it during the removal. All the stores, offices, and several of the suites of apartments were occupied and the occupants were not disturbed in the process, as the water, gas and other pipes were kept in working order by means of flexible tubes.

PREPARATION PREVIOUS TO REMOVAL.

"To prepare the building was an undertaking requiring to be well considered and thoroughly understood before the work was commenced.

"For this purpose plans were made of the entire structure, and a general course of action adopted. Models were made showing how each part could be securely

loaded, and then a full model of the whole basement. It was the intention at first to tie the building together on several of the stories above the ground floor, but after repeated experiments in piling up blocks and then moving them at the base of the lower ones on a level surface, it was ascertained that no jar was communicated to the upper blocks by the motion of the lower portion, if this lower portion was properly tied together, and the result has proved that such was the case.

"Work was commenced on June 1st, 1869, by clearing the basement of all the wooden partitions, and excavating to the level of the foundations. After this was done, heavy block granite levellers were laid westerly from the front, rear, and partition walls to a distance of fourteen feet from each, and similar levellers every four feet between, to receive the walls running north and south as the building progressed, making four rows of eighteen traverses each, all laid solid in cement thoroughly rammed down to avoid any danger of settlement, as they bore the immense weight passing over them. Those under the front piers were six feet wide, and the others three feet, all being three feet below the surface. On the top of the granite (except those under the posts) a brick wall was laid in cement twenty inches wide. Those under posts were levelled up with North River flagging and slate. On the top of each of these traverses, four iron rails, three and one-half inches wide under the piers, and three inches wide under the walls, and one-half of an inch thick, were bedded in cement, and made perfectly level, and eight similar rails under the front piers. Between these iron tramways, under the Tremont street wall, greased ways were laid to assist the moving of the rough granite wall before mentioned.

"The process of loading the several piers and walls on the iron rollers by which it was to move was as follows: Rollers an inch and a half in diameter

were laid one inch apart under each brick wall on the iron rails at right angles with the front wall on Boylston street. This was very important, as the building was to be kept in its new position on a straight line with this wall, and any variation from a right angle would change the direction. A square piece of hard wood was put between each roller to act as a guide, and also to aid in replacing the same when they came out from behind as the building went forward, all having to be constantly watched to keep the rollers in position. Over the rollers similar iron rails were placed, and on these rails North River flagging stone, the latter being thoroughly wedged with slate, pointed with cement, to take the bearing of the wall above. This process was repeated under all the brick and stone walls on the lines of the several traverses. The most difficult part of the undertaking was the loading of the heavy stone posts on the front and a portion of the side, to accomplish which it became necessary to lower the levellers about eight inches to get sufficient space to put the rails and rollers under them. To do this these posts were clamped by beams, screwed together with inch and three-quarter iron bolts, six to each post, and under these beams were placed white oak timbers of sufficient length to reach outside the levellers, resting on from twelve to twenty-two bed screws, which were turned just enough to hold the weight above, but not to raise it in the least. This was ascertained by cementing between the posts and the levellers and also between the latter and the ground, as sometimes the leveller went with the post, and at others separated from it, and when the smallest crack was discovered in either place, no more force was used. The leveller was then lowered and bedded in cement, screws being applied between it and the post overhead to press it down, after which the rails and rollers were put in place, as before described, and between the upper

rails and the bottom of the stone posts, strips of North river flagging four by six inches were placed, the centre one being set first, and wedged sufficiently to take the bearing, then the others put in one by one till the whole surface was covered, each being carefully wedged. The screws were then removed, and this process was continued under each post without the least damage to the building. This operation required more skill, and in fact was more difficult and dangerous, than the removal of the building itself.

"In order to tie the lower part of the building together as firmly as possible, so that the power, when applied to the exterior, should operate equally on the interior walls, timbers eight inches square were placed on each side of the walls running north and south, and over each of the tramways, timbers of the same size, running in the direction of the line of motion, wedged in between the others. That these might be wedged up without spreading the walls, six one and one-quarter inch iron rods were run through between these braces and screwed up tightly on the outside. This arrangement made the lower part of the hotel perfectly steady.

"On the exterior of the Tremont street side a hard pine timber, fourteen inches square, was set about a foot above the rollers, running the entire length of the building, and extending under the granite sidewalk on Boylston street. The inner part of this was supported on a brick wall, and the outer on a framework of timber, both of which were slipped along on greased ways. Against the bank wall of the street three-inch plank were set vertically, outside of these another heavy timber, and between these timbers seventy-two screws, which were required to start the building (afterwards reduced to fifty-six), each two inches in diameter, and one-half inch pitch, were set, this being the power by which the building was to be moved.

"In preparing for the removal, over

four hundred perches of block granite, three thousand feet of North River flagging, forty-six thousand four hundred and thirty-two pounds of iron, which included nine hundred and four rollers, and forty-nine thousand nine hundred and eighty-two feet of lumber were used. The work of preparation was completed on Friday afternoon, August 20, being two months and twenty days from the commencement.

MOVING THE STRUCTURE.

"Everything being in readiness, on Saturday morning, August 21, a man was stationed at every four screws, and twenty men along the lines of the several walls to watch the rollers as they came out and replace them in front, they having to be changed every two inches the building moved. At a signal given by the superintendent, every man at the screws made one quarter turn, which carried the hotel westward about one-eighth of an inch. The rate of moving was about an inch in five minutes; the greatest speed was two inches in four minutes. It took about an hour and three-quarters to move the length of the screws, which was twenty-one inches, and when this distance was accomplished the work was suspended each time to rearrange the screws and blocking. The distance accomplished the first day was thirty-six inches, the second day five feet, the third day forty-six inches, and the fourth day two feet; the whole distance, thirteen feet and ten inches, being completed on Wednesday morning, August 25, at twelve minutes before ten o'clock. The actual time of moving was thirteen hours and forty minutes.

"After the building was in its destined place, the interior braces and ties were cleared away, the iron trainways taken up, and such of the rollers as were loose taken out; the others were left in their places, the wooden guides being removed, and the spaces between filled in solid with Portland cement.

"Four thousand three hundred and

fifty-one days' labor were spent in performing the work, and the whole cost was about thirty thousand dollars in currency.

"Larger buildings have been raised, but none of equal size removed. Moving a building is an entirely different operation from raising one; in the former you go from an old on to a new and untried foundation; in the latter you have the old constantly to work upon.

"We know of no other enterprise of the kind which has attracted so much attention as this. Thousands of people visited the place during the progress of the work, and the complete success accomplished is one in which the citizens will always take pride, and one that reflects great credit upon those who had it in charge."

SYDNEY UNIVERSITY.—At the monthly meeting of the Senate of the Sydney University, on Wednesday, the 1st inst., the Senate, by an unanimous vote (on the motion of the Rev. Canon Allwood) passed a formal resolution, under the fourth section of the by-laws, declaring Mr. Edward Reeve, the Curator of the University Museum of Antiquities, to be "one of the superior officers of the said University," and, as such, entitled to an *ex officio* vote as "a member of the University," under the provisions of the University Incorporation Act. The Senate also, and at the same time, voted to Mr. Reeve the sum of £50 for the printing and publishing of the catalogue he has written and compiled for the use of visitors to the museum under his especial charge.—*Sydney Herald*.

A MEETING was held in Quogue, on the 7th instant, for the purpose of raising sufficient funds to build a church. At the meeting \$525 were subscribed and more promised, making over \$2,500 in all subscribed for the purpose.

NEW MACHINE FOR STONE-DRESSING.

This is the invention of Mr. Joseph E. Holmes, an American, and is highly spoken of in England, by the most accomplished engineers as well as practical builders.

The machine consists of a small steam engine connected with that part of the apparatus in which the working of the stone is performed. The principle of the invention is exceedingly simple. The block of stone to be dressed is placed under a series of chisels in the first instance, which are impelled by an arm-shaped lever, which is itself driven by a slightly cranked shaft. On the power being applied, the stone is propelled forward, and as it advances, lines of ridges are cut on its surface. On reaching the end of its course, the action of the level is reversed. The driving shaft is connected by a bevelled gear wheel with the shaft by which the motion of the stone is produced. To procure the reversed motion referred to, a pin is taken out of the arm-shaped joint. During the first process about three-fourths of an inch is taken off the surface of the stone, and then the power of the cutting apparatus is modified as occasion may require. To finish the stone completely, a knife is employed instead of the series of chisels alluded to. Amongst the experiments performed, one of the most interesting consisted of the dressing of a block of freestone six feet long and one foot ten inches wide. This was practically finished in an hour. The dressing of a stone of similar dimensions would occupy a mason for a whole working day. The engine was eight horsepower, but a much less powerful motive machine would have sufficed for the operations specified. In addition to the apparatus driven by steam, is another smaller and less complex machine, constructed to be driven by hand. The power of the machine, however, was most efficaciously proved by the appearance of the blocks of Guernsey

granite and Irish marble—considered the two hardest stones of their respective kind—dressed by the smaller machine to which allusion has been made. It is not in the saving of time only that the value of Mr. Holme's invention consists. The faces of the stone dressed by it in either modification present none of the inequalities which necessarily occur on the surface of stone dressed by hand. The lines on the blocks treated by machine action were as nearly mathematically parallel to each as could be conceived; whereas those on the blocks finished by hand, with which they were placed in juxtaposition, were palpably crooked.

TINTS TO EXPRESS BUILDING MATERIALS.—The tints employed among engineers and architects are as follows:

<i>Materials.</i>	<i>Color.</i>
Brickwork to be executed (in plans and sections)....	Crimson lake.
Brickwork in elevations.....	Crimson lake mixed with burnt sienna or Venetian red.
The lighter woods, such as fir.....	Raw sienna.
Oak or teak.....	Vandyke brown.
Granite.....	Pale Indian ink.
Stone generally....	Yellow ochre or pale sepia.
Concrete works....	Sepia with darker markings.
Wrought iron.....	Indigo.
Cast iron.....	Payne's grey or neutral tint.
Steel.....	Pale indigo tinged with lake.
Brass.....	Gamboge or Roman ochre.
Lead.....	Pale Indian ink tinged with indigo.
Clay or earth.....	Burnt umber.
Slate.....	Indigo and lake.

CHICAGO is going to have another monster million-dollar hotel.

POLYGONAL PLANS.

WE too often see going the rounds of the journalistic press a notice of some new proposition, or so called invention of an "entirely original" mode of building, which is really original only to the supposed author's mind; being old enough in the memory of the general public.

It is not long since the news item appeared that a Mrs. Irwin, the sister of "Stonewall" Jackson, had obtained a patent for an entirely new mode of house building, namely: the hexagonal plan. This the newspaper paragraphist declares to be a vast improvement upon all preconceived ideas of elegance, comfort, economy, and the utilization of the largest amount of space in the smallest amount of boundary walling. The enchanted itemizer even declares that the hexagonal figure proposed for the future plan of our houses will give a great amount of beauty in architectural effect!

Now, all this is absurd. To any one who will take trouble to think for an instant it must be evident that the hexagonal figure is not as roomy as the octagon; nor is the octagon as economical of space as the circle. Why then depart at all from the circle, if it be such a very urgent matter to enclose as much with as little boundary as possible. But, where is the economy? The flooring timbers must be cut, at a waste of material, to suit the peculiarity of figure. So must the flooring-boardings. The roof too will be subject to the same waste of material, in timber, boarding and slating. The walls also will be much more expensive, as will be the plastering, on account of the number of angles, for each of which the workmanship will be double.

Now, let us look at the internal arrangement of a polygonal plan. There cannot be a well formed room in the house, and if there could it would be at

the expense of the others. 'Tis true that there would be an excellent chance for closets, but they are expensive in their way, and too many of them is just as objectionable as too few.

We have not said anything about the unproductiveness of a polygonal form in view of the attacks of storms, or the overpowering influence of solar heat; but it is certain that three sides in a hexagon, and four sides in an octagon must be exposed to such influence. Not so the cubical or square forms. One side is alone presented to the weather. The cube is unquestionably the most advantageous form for the economy of both space and construction; and the opportunity it affords of multiplying, or massing together several such forms, of different or similar dimensions, is its great advantage in an artistic as well as an architectic sense.

All timbers are cut to certain specified lengths, and therefore there is an avoidance of waste in the cubic form. All rooms are confined to four angles, instead of being multangular; and therefore the workmanship is free from the "extras" which accumulate in the latter.

As a household plan the hexagon or octagon is very injudicious and inconvenient. Furniture is never "at home" in it; for, there are too many oblique walls. Carpeting is seriously at fault, and nothing looks shapely or well. Fireplaces—those most welcome companions and warm friends of our family circle, become exceedingly unruly members of the architect's design; for, his chimneys above the roof must be made to present a favorable appearance, and if uniform on the plan of the roof must, of course, influence the partition walls, and dictate the exclusive plan of every story. If there is to be but one chimney shaft, at the centre, into which all the respective flues are to be gathered at a certain

point below the roof, then there is no difficulty with the exterior arrangement and effect, but every room in the house will have an angular fire-place, and the necessarily large amount of weight located at the centre will call for a sufficient foundation to prevent settlement at that point. But we will not go further into the question, if a question it can be properly called, of superior fitness in the forms just spoken of, and indeed we would not have taken up the subject at all, but that we desired to correct the ignorant assertions of those thoughtless, we might even say reckless, writers in the daily journals, whose flip-pant opinions are but too widely spread abroad amongst the millions, and are therefore so apt to be mischievous as leading some to venture on utopian plans, which must eventuate in expense, discomfort, and utter disappointment.

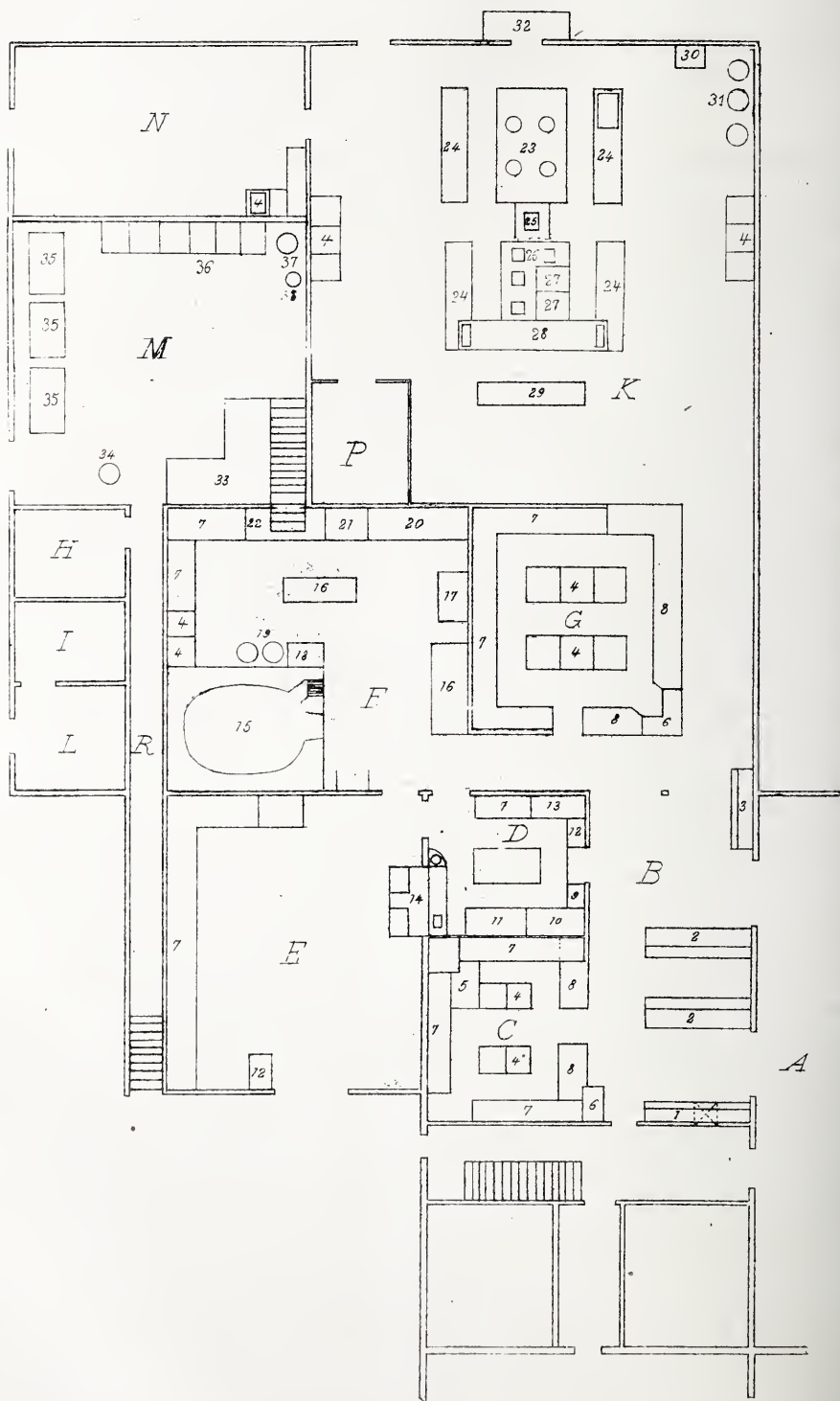
Professor Fowler, the well known phrenologist, of New York, became at one time so possessed of an idea of the immense advantage of the polygonal form for our dwellings, that he built a residence for himself on the Hudson river in the octagon form. How that form affects the eye of the observer, we will not now inquire, knowing the effect it had upon us at first sight. But, if the public generally have not caught at the proposed reform it surely was not the fault of the well-meaning professor, for he widely published a cheap book in illustration and support of his novel system.

There are at all times people who will pounce with avidity on anything novel or out of the way; and, the time at which the octagon idea had its birth, was rife for new "facts" of science, and theoretical constructions; so that had the professor's octagon mansion possessed any inherent merit, there is little doubt but polygamism in building would have been fully as successful amongst us, as polygamy has proved to be in the Mormon dispensation. An undesirable event in any way we view it.

WHENEVER the timber resources of Alaska have been brought to view as an element of future wealth, some one of the many volunteers who are depreciating that country is ready to inform the world that there is a plenty of timber this side of Alaska. We have before us some data furnished by a resident of Sitka, which shows among other things that there is an extent of country bordering on the coast of Alaska, equal to twenty miles in width and 700 miles in length, in which the white and yellow cedar predominates. How much more extensive the "Cedar Country" may be our informant did not know. The cedar timber is there inexhaustible. Our redwood timber covers a limited area, and at the present rate of destruction will not last fifty years. The time will come when the cedar forests of Alaska will be more famous and a greater source of wealth than are now the redwood forests of California. Probably no tree is now growing upon the Pacific coast of so much real value as the red cedar of Alaska.—*San Francisco Bulletin.*

THE BRIDGE TO BROOKLYN.—That New York and Brooklyn Bridge seems as if it were really going to be put up, after all. Tuesday morning, January 4th, the "preliminary steps" (which have been often taken) were taken again to lay the foundations of the Brooklyn tower at the upper slip of Fulton Ferry, by tearing up the wood work of the dock located there. By active operations it is intended to have the bed clear for the reception of the caisson by the middle of March. Two steam derricks and fifty laborers are already engaged, and in a few days two steam dredging machines will be put in operation. The number of stones and heavy boulders at this point will necessitate the employment of divers for the purpose of blasting. The General Superintendent, William C. Kingsley, is conducting the operations.





L. H. Rosenthal, Phila.

KITCHEN ARRANGEMENT.
(Cresson Springs Hotel)

HOUSEHOLD ECONOMY.

CRESSON SPRINGS HOTEL, KITCHEN ARRANGEMENTS.

AS our country increases in population and wealth, an intensity of life is found in our cities which, but a few years ago, we should scarcely have thought possible, and this has brought with it the necessity for change, for summer relief, from the hurry and strain, the anxieties and cares of business. Every year it increases, and with the demand comes the supply. Rapid and luxurious travelling accommodations in every direction, and hotels of palatial magnificence entice the already willing seeker after pleasure and rest. Nor do we speak only for the father and mother, wearied with the excitement and gaiety of a city winter life, is longing for the retirement and repose of the sea-side, or green and shady mountains—let us also enter a plea for the children. How the year old baby battles against the almost inevitable influence of the hot and dusty city, and comes from the contest in the fall, weak and perchance with a constitution containing the seed of future disease. Not so with those whose earliest expression of delight has been prompted by the yellow buttercup, the playful lamb, or the sandy beach, there are gathered a store of strength which may bless their old age.

The promptings of reason here coincide with the requirements of fashion, and rows of deserted houses attest the obedience of the absent families; but they leave behind them the *comforts* and *conveniences of home*, and they will go where they find the nearest approach to these. For some the soft balmy air of ocean, with the fishing and sailing has charms. Some may prefer the constant change of a summer in Europe, or a visit to California; but for those who covet a quiet mountain home, let me briefly describe the surroundings of

Cresson. Two hundred and fifty miles from Philadelphia, and one hundred from Pittsburg, it nestles upon the mountain side of the Alleghenies, where upon one hand you may see the wild deer, and upon the other the railway train almost at the door. A clear mountain stream runs by the lawn, and mineral springs near by attract many. The walks and rides are beautiful and wild, and the railroad ride across the mountains to Altoona, is perhaps unsurpassed in the eastern United States. The main building fronts the west, and from its broad porch can be seen such sunsets as only the mountaineer knows. Clustered in the woods which surround the principal building, are groups of cottages where families may have all the retirement of home, and be free from the weary cares of housekeeping. While all these things delight the visitor, let not the pleasure of the table be despised. "He giveth us richly all things to enjoy," and the sincerity of that man may be questioned who affects to despise the reasonable gratification of the appetite.

The obliging and gentlemanly proprietor, G. W. MULLEN, is justly celebrated for his care and success in the culinary department, and knowing the very incomplete character of the old arrangements, proposes to build during the present winter, kitchen and laundry buildings as shown in the annexed plan.

While this plan will be interesting to the general reader, they will have a special interest for the architect, as they represent many of the later improvements.

The portion shown, 66 feet square, is new, the remaining portion shows the *old Kitchen* under the corner of the main building. It must be remarked that owing to the necessity of allowing the old walls and partitions to remain, the

relative size of the parts are not just what could be desired. The shape of the ground and the surroundings also changed somewhat the position.

The Kitchen, Dish-room and half of Bake-house, are one story high, with a ridge ventilator and sky-light. The Servant's dining-room, Laundry, Engine and Boiler house and half of Bake-house, have a second story, over which will be occupied as an ironing room and steam drying room.

The end of the dining-hall, which is 100 feet by 50, is represented at A ; it is entered by both ends from the main house, and also from the porch.

B, is the Carving-room, connecting by two doors six feet wide, with the dining hall. It contains an ice-box and sink for cutting the ice, with pitcher closet over and adjoining. This is convenient for servants to carry ice water up stairs as well as into the dining hall. It is shown at 1. The Carving stands 2, 2, are each ten feet long, made of copper, with dishes of the same planished, and heavy sheet tin covers. The lower part of the table is filled with water which is heated by steam pipes, thus keeping the dishes hot during the entire meal. At 3 is a similar stand, with five planished copper urus for coffee, black and green tea, milk and hot water; they rest upon a closet used to keep the cups and saucers in. C, is the silver, glass and cup Pantry. Upon the open counter, 8, 8, the soiled dishes are received, the contents removed and dropped through an opening in the counter into a large bucket. The dishes are then placed in the sinks, 4, 4, washed and dried, and put away on the dresser and into the closets, 7, 7, 7. The silver is cleaned upon the table 5. 6, is a steam dish heating Closet, with galvanized sheet-iron shelves resting upon coils of steam pipe. It has a door to open from the cup-room to place small dishes in, and one opening into the carving-room where the waiters may get the warm dishes.

D, is the distributing store-room,

where the waiters receive the various articles of desert, as well as milk, butter, bread, etc. It is in immediate connection with the bake-house F, where many of the articles kept here are prepared, and also with the main store-room E. In the centre of the room D, is a large table where the ornamental part of deserts are prepared, dishes of fruit, etc., it is fitted up with large drawers. 9, is a small marble slab for butter. 10, is the Bread Closet. 11, Sugar bins. 12, Desk. 13, Spice cans. 7, Closets and shelves. 14, is an Ice-box or Refrigerator, open from the main store-room E, and also open to D, so that the milk and butter may be conveniently given to the waiters through the open window which communicates with the room B.

G, is the main Dish-room, with its open counter, 8, 8. Sinks, 4, 4. Shelves and closets 7, 7. Steam dish heating Closet 6, for large dishes. This room is on the way to and from the kitchen K, and dining-hall, so that the soiled dishes may be left and clean ones obtained.

The Bake-house F, is thus arranged: 15 oven, 16 table, 17 marble pastry table, 18 steam tight galvanized closet, for steaming puddings, 19 copper steam jacketed kettles for preparing fruit, jellies, etc. The use of steam prevents the scorching, so unpleasant to the taste. 20 Dough trough. 21 Ice-box. 22 Flour. 7, 7, closets, and 4 sink.

K, is the Kitchen. At 23 is shown a double cast-iron range, ten feet long, six feet wide, with four fires and six large ovens. 25, is the chimney. The flues from the range are so connected with the chimney as to leave the whole surface of the range for cooking. 26, shows four steam holes, two of them may be used to bake hot cakes. 27, 29, are two broilers, and 24, 24, are tables. 28, are six steam vegetable boilers and steamers, and at each end of these is shown the egg-boilers, also by steam. 29, is a vegetable table, similar to the carving table 2, 2, but with different shaped dishes.

These arrangements insure hot vegetables during an entire meal, a great desideratum for hotel keepers. The part of the kitchen just described has a brick floor, and is covered by a sheet-iron canopy, having a large central ventilator extending above the roof, and carrying off the fumes from the kitchen; also protecting the frame roof from danger of fire. 32, is a bin for coal which is filled from the outside. 30, is a large box, or sink, where the cooking utensils can be boiled by steam, thus saving much hard labor on the part of the cooks. 31, are copper steam jacketed stack and soup pots.

P, is a room for the use of the head cook. N, is a Dining-room for the servants.

L, is the Boiler-house. I, the Engine-room. H, the Laundry-office, and M the Laundry. 35, 35, 35, is a sett of three of Smith's Patent Hydraulic Washers; these are the best washers now in use. The articles to be washed are placed in a hollow cylinder full of holes, which revolves in a tight box containing the soap-suds. After revolving in one direction for a few turns they reverse, and thus the water flows back and forth through the articles to be washed. Lace curtains can be washed in these without tearing them, and they are equally suited to the heaviest washing. They are supplied with steam, hot and cold water. 36, is a sett of hand washing tubs. 34, a Centrifugal Wringing Machine. 33, a large table. 37, the soap tub, and 28 the steam starch-boiler.

The stairs lead directly to the steam drying-room, which is over L, T, H, and part of F, and the ironing-room with mangle and stove, is over M and N. A line of shafting from the engine runs the washing machine, wringer and mangle.

The passage R leads to the second story of the main building.

WM. G. RHOADS,
1221 Market street, Phila.

A GRANDSON of Thomas Jefferson has felt impelled to communicate to the public some fresh information relative to his illustrious grandsire. Mr. Jefferson was a liberal contributor to churches of all denominations, and was a regular attendant of the Episcopal church. He was opposed to pew-rents, thinking that as "money made no choice of seats in heaven it ought not in church." After fifty years' office he died poor, leaving his family destitute, but with no debts unpaid, and his memory is unstained by failure to meet any engagement, pecuniary or otherwise. The mania for relics from the graves of the great has played sad havoc with them. The hard granite of the truncated obelisk of Mr. Jefferson's monument resists in part these assaults. It is particularly disgraceful that the beneficiaries of Mr. Jefferson's work, the University of Virginia, should be the principal desecrations of his tomb, and yet this is even so, for the students of the University are the principal persons who carry away the sacred chips ruthlessly broken from the monument of their great benefactor.

WOMAN'S ENDURANCE.—A student at Ann Arbor, having remarked that men had more endurance than women, a lady present answered that she would like to see the thirteen hundred young men in the University laced up in steel-ribbed corsets, with hoops, heavy skirts, trails, high heels, pautiers, chignons, and dozens of hair-pins sticking in their scalps, cooped up in the house, year after year, with no exhilarating exercise, no hopes, aims or ambitions in life, and see if they could stand it as well as the girls. Nothing, said she, but the fact that women, like cats, have nine lives, enables them to survive the present *regime* to which custom dooms the sex.

CHICAGO proposes to keep a large building heated through the night to shelter the homeless poor.

SYDNEY POST OFFICE.—Satisfactory progress is being made with the erection of the new post office. The whole of the building is up to the first floor, with the exception of a small portion of the George street elevation, and the walls at the back are advancing towards the second story. The ten polished granite columns supporting the arcade on the north side of the edifice are in place, and workmen are now employed in carving the foliated capitals which are to surmount them. The capitals of the pilasters on the inner wall of the arcade and the cornice to the ground floor are also completed. The sculptured spandril representing the arts and the royal arms over the central entrance are nearly completed, and several other sculptured spandrils are in hand. Two of the polished granite columns in the George street façade, with Corinthian capitals, are in place; and the Italian capitals to the piers are carved. The other granite columns are being polished. The building at the back comprises workshops for the telegraph, with stables and other offices in the basement, and this part of the structure is well advanced. The part of the building already completed contains many pretty examples of sculpture, and the effect of the whole is extremely beautiful and pleasing. The contractor (Mr. Young) has every requisite appliance for carrying on the work, including steam machinery for polishing and hoisting. The upper portions of the post office will probably be erected quicker than that which has already been done, as the work will be less difficult and tedious. When finished, the building will be one of the finest specimens of architecture in the colony—a credit to the city, and a monument to the ability of the Colonial Architect, by whom it was designed. We believe that, at present, provision is made for only a footway along the northern side of the building, twenty feet wide. This lane, however, will be quite inadequate to the requirements of the public traffic; and

it can scarcely be expected that the government which has shown such munificence in the erection of a building of great public importance will permit it to be obscured by the shadows of dingy warehouses and back premises of less presentable appearance. In no part of the city is a thoroughfare of at least the ordinary width (sixty feet) more needed, and the corporate body, as well as the citizens generally, would do well to bestir themselves for the attainment of so desirable an improvement.

A CORRESPONDENT of the *London Builder*, asks:

"Why should we not make our houses unflammable, and our furniture fire-proof? It can easily be done—or rather it could be—if there were some sort of compulsion put upon builders and upholsterers. Timber is the material that needs the preservative, and it may be prevented from firing by simply impregnating it with a concentrated solution of rock-salt. The fact has just been announced by a German chemist, who was commissioned to solve the question by a fire insurance company. Water-glass will act as well, but it is expensive; rock-salt is cheap. The salt, too, renders wood proof against dry rot and the ravages of insects. Its antagonism to fire might be turned to account in extinguishing flames, for a solution pumped out of a fire-engine upon burning matter would be vastly more efficient than plain water."

A NEW chapel for the Divinity School, Cambridge, Mass., erected by R. C. Mason, of Boston, was consecrated recently. Although it cost about \$75,000, it will only seat 150 persons.

MINNESOTA.—The cost of substantial improvements in St. Paul the past season was \$1,395,727. Last year it was \$1,000,000, a gain of nearly \$400,000.

HIGH SCHOOL HOUSE FOR THE CITY OF WORCESTER, MASS.

THE city of Worcester has just contracted for a new high school building, to meet the growing wants and demands for such a building here. The front is 130 feet in length; its depth, from front to rear, 87 feet. It is to be three stories high above the basement. The first and second floors contain each 7 rooms, about 29 by 32. These are intended for school, lecture, library and philosophical purposes, as may be demanded by the course of studies to be pursued and the advantages to be given the pupils in attendance. The third story is devoted to a spacious hall, about 80 feet square, having connected therewith all the usual convenient modern appendages of anti-rooms, etc. The basement is entirely devoted to the steam heating apparatus, cloak and hat rooms, water-closets and water-fixtures, and such other conveniences as render the building useable, comfortable and cleanly after our modern style of living.

The committee having the matter in charge have availed themselves largely of the experience of other New England and Middle States cities, to aid them in perfecting an edifice complete to the extent of the present state of improved school architecture. In addition to this the competition of architects was brought into requisition to perfect what was wanting in skill of the committee. The successful architects were, Messrs. Gambrill & Richardson, of New York city. The local superintending architects are Messrs. Earle & Fuller, of this city. The contract has been awarded to Messrs. Norcross & Bros., for \$106,000. The structure is to be of brick, with stone dressings, intermingled with brick shaded and tile ornamentation.

There are also two other school houses in process of erection or completion by the city, for the use of the Primary, Secondary and Grammar Schools. Each

containing ten rooms, capable of accommodating fifty scholars to a room. Thus by the close of 1870, there will be added to the present school accommodations, room for about one thousand additional scholars. These rooms will be largely filled at commencement, from the present overcrowded school rooms.

ARTIFICIAL BUILDING STONE.—Since Austin's very successful manufacture of artificial stone, in London, now more than thirty years ago, it is surprising how few efforts have been made to supply a thoroughly good substitute for our best natural building stone. True, there have been attempts, but they were for the most part utter failures. In such a state of things we cannot but welcome any new introduction, and although we have had no personal experience of what is called Frear's Artificial Stone, now being manufactured by a company, at Chicago, we gladly call attention to the fact that it is highly recommended by architects and others in Chicago, where it has been successfully put in operation as a building material, and established a good name for itself. For decorative work on a front, what could be more facile than this composition stone? It must be far more economical than cut stone, and always more easily attainable.

Such an invention as really reliable artificial stone is the most desirable aid to Architecture of which we can form any idea, and we sincerely trust that time will prove the worth of this Frear's manufacture, of which we will speak more particularly at another time.

A CITIZEN of Chicago has given \$250,000 for the erection of a grand, free, Universalist church in that city, and the perpetual support of worship therein.

THE BOSTON POST OFFICE.

THE exterior façades will embrace a total frontage on Water, Devonshire, and Milk streets, of 440 feet, with an average height above sidewalks of 100 feet; the central portion of each façade will, however, reach to the height of 126 feet. The style selected by the supervising architect for these façades is that known as the Renaissance, and the composition of each street side of the building may be briefly described as follows:

"A noble basement or street-story of twenty-eight feet height, formed by a composition of pilasters and columns resting on heavy plinths or pedestals at the sidewalk level and crowned with an entablature, carried by two stories above it, both of which are enriched by ornate windows—dressings admirably in keeping with the best examples of the style selected. The principal entablature of the exterior walls will be singularly effective in detail, with the most conspicuous roof yet introduced upon any structure, erected in this country. In the several faces of the street sides of this roof are placed highly burnished dormer windows, intended to be constructed of stone or iron, above which the top of the roof will be finished with cornice and fascia forming the seating of the bronze grille intended to enclose the entire upper section or flat of the roof. In idealizing the roof of the structure the architect has introduced several exceedingly novel and expressive features of finish, avoiding, it is believed, the sameness of expression which too often characterizes the 'Louvre' and Mansard roofs. The Devonshire street façade is subdivided into five compartments by a 'central projection' flanked by two 'entrains,' finished at the corners of Water and Milk with 'pavilions.' The 'central projection' and the two pavilions are respectively subdivided in their height by orders of pilasters, columns, entablatures, and balustrades, and the curtain finish is dependent for its effect

upon the window dressing and attached entablatures and balustrades, excepting in the first or street story, where the order of the first or street story before referred to is carried uniformly through the entire length of the three street façades. The principal centre entrance in the Devonshire-street façade communicates with a broad staircase, located in a noble hall communicating directly with the second, third, and fourth stories. The remaining entrances of this side of the building give access to the post office corridor, designed to be twelve feet in height, above which the strong light to be secured by the liberal window openings of the first story will ensure the full lighting of the post office apartment behind the corridors of this and the other two streets on which the building bounds. Both the corner pavilions of the Devonshire-street side are repeated on the Milk and Water-streets sides, and the architecture of these last will correspond in detail and finish with the Devonshire-street front aforesaid. Two groups of statuary are designed in the central projection of Devonshire-street side—one of them to crown the principal entrance and the other group to surmount the fine stone 'attic' which covers the central projection and faces the more elevated portion of the roof over that side of the structure. The central group of statuary, on the attic, is flanked by sculptured eagles, respectively located over the two outer corners of the attic. Approaching the structure from either of the principal thoroughfares surrounding it—whether from State through Devonshire street, Franklin and Milk through Devonshire street, Washington through Water street, or Washington through Milk street—the effect of this monumental mass to the eye will unquestionably be most harmonious and gratifying."—*Boston Transcript*.

REGISTERED STEP PROTECTORS are just now attracting notice in England. They are old here.

STAIRS AND STAIRCASES.

OF all the prominent features of any building, public or private, not one can claim the attention of the architect more completely than the stairs. It is at once an object of utility and of appearance—utility in giving the most desirable access to the upper part of a house; and appearance in presenting so necessary a feature in such a manner as to make a pleasing impression on the mind of the observer.

In large buildings there is ample space for a suitable staircase, a fact which few architects would fail to take advantage of. In houses of limited size, however, the trouble of producing a fair effect is sometimes very great indeed, and will try the invention of an architect probably more than subjects of apparently greater importance. Although, as we have already said, the design of the staircase is that of a prominent feature and a subject which should call for particular attention. Before the days of Henry the Seventh stairs were carried up in small towers, being winding and inconvenient. They were most generally of stone, though sometimes of wood; and were sustained at the centre by a newel-post. These winding stairs were as numerous as the extent of the building required, but their very great inconvenience eventually forced a reform, and in the reign of Queen Elizabeth, straight staircases were introduced which towards the middle of that era assumed an appearance of elegance and comfort, quite the opposite of the staircases of preceding times. In fact we cannot in our day excel the workmanship of the Tudor times, and we therefore follow it as nearly as ability will admit.

No house of any consequence, where comfort is sought, should be without two stairs (if not more), the principal or grand stairs, and the private or back stairs. The former occupies a

prominent position in the hall, and the latter is in the rear of the house; by which arrangement all the domestic work of the family is done privately, and the servants' department is thus effectually excluded from the family part of the house, which is invariably the front in all constructions.

The position of the main stairs is a matter of great moment, for its location must regulate the apportionment of the story to which it leads.

A staircase should be properly lighted, and in this regard the most desirable effects of internal finish are concerned. The risers of the steps should not be less than six inches nor over seven and a half, so as to make the ascent easy and gentle. The treads should be broad, but not too much so. Twelve inches is a fair breadth, although they may be fourteen. An eminent authority observes:

“Back stairs require less tread and may have more rise, being for use only, and not exposed to general view. They should be so placed in the house as not to be seen from the other staircase, and be near the common sleeping-rooms of the servants, to which they lead; and the back stairs, where the room is little, may be composed chiefly of winders. The forms of the principal or best stairs are as various as the rooms to which they lead; but it is necessary to observe, that each flight must not be too long, that is, not contain too many steps, and if possible avoid having winders, or, at least, but a few: the first is objectionable as being tiresome, and the latter incommodious and dangerous, for if by chance two persons should meet on them, the descending person might happen to fall.

“As all chambers or sleeping-rooms require to be as far from noise and tumult as they conveniently can, and also so near to the staircase that if any

accident by fire happens an easy access may be had to it; so all back staircases in great houses should be carried from the ground floor to the attic, constructed of stone, and the walls of them stuccoed, that no danger of fire might prevent the safety of getting down them, or passing over the roofs (if in a town) to escape the fury of the flames. There are three usual places in a house in which the principal staircases may be placed, and which is left to the choice of the architect. First, in the front, just within the entrance-hall; secondly, in the middle of the house, beyond the hall; and, thirdly, at the back or rear of the house. When the staircase is placed in the front hall, the family are too much exposed in passing up and down them. In the centre of the house, the staircase becomes a grand object with its handsome lantern-light over; but here it cuts up too much of the interior. At the back the staircase is best for the general arrangement of the rooms; and when the returning parts of the stairs fall back into a semi-circular or segmental bow, they become handsome. The principal staircase in all good or first-rate houses should be formed of Portland stone, and the steps long enough for not less than two people to walk up them side by side.

"It was at one time held as a rule, that nothing should obstruct the sight of the staircase on entering a house; though this opinion afterwards changed, and the architect placed the staircase in the centre, and, lastly, in the back of the house, but in a direct line with the entrance-door, an appropriate place, where a lobby intervenes. The staircase should, however, present itself boldly and freely to the sight. As to the situation of the staircase varying with respect to the principal door, it is a point much disputed; there is, however, in some edifices, no disadvantage in making it face the entrance door, and bringing it very far forward; in others, as we have shown, there is a greater conven-

ience and beauty given to the object by placing it back, but in the direction straight before the door. Some prefer placing the staircase on one side of the entrance; this, I think, is not so eligible, particularly in public buildings, though there are some good examples where they appear very noble when enclosed by a screen of columns. The staircase of Drury-lane Theatre, London, is so situated—an exceedingly grand design.

"In Italy there are many grand staircases, both in the public and private buildings. The Scala Regia, in the Vatican at Rome, is the most superb perhaps in the world, consisting of four flights of marble steps, adorned with a double row of marble Ionic pillars, each in one piece and of beautiful colors. This staircase forms a prospective of singular beauty and grandeur. The staircase in the Louvre at Paris has a most magnificent effect when approached, and strikes the beholder with astonishment. The staircase consists of one immense flight of marble steps, but having several quarter spaces, on either side of which are two magnificent marble columns with their entablature, supporting a vaulted lacunary ceiling. The staircase in the palace of Versailles is, however, the grandest and most splendid perhaps in France, designed by Mansard, which, like the rest of this palatial edifice, is superlatively grand, splendidly enriched with noble pillars, between which are busts, and above a ceiling adorned with historical paintings, and ornaments emblazoned with burnished gold.

"Staircases, when designed with judgment and taste, are the most noble and beautiful part of the interior of the house, and the first object of consequence that arrests the attention; therefore, too much care and ingenuity cannot be bestowed upon them. The object the architect should here have in view, is that of giving to the separate flights a graceful turn; to have plenty of light, and spacious landing-places.

THE LENOX LIBRARY, NEW YORK.

NO city of its size and importance in the world, is so miserably supplied with library reading facilities as New York. The late Mr. John Jacob Astor, bequeathed the means for establishing a public library, but so injudiciously was the bequest carried out that a few book worms and ennui-killing loiterers were alone benefited. The hours of admission are from 9 A. M. till 5 P. M., the interval being a sealed volume to the business public, employed at the permitted time. Moreover, the collection is limited, and chiefly remarkable for the workmanship of the bindings. In short, with all its carving and gilding, it is exclusive in the extreme, and unworthy the comprehensive and liberal title of a "public library." The Mercantile Library, Clinton Hall, is no more than any ordinary subscription institution we commonly find in our minor cities, and certainly does not merit the name of a public library. There is no other. What a deplorable want for a population of a million to bear with.

But, time and progress will produce desirable reforms, and so the Empire City is about to see the unclouded light of literature at last, in an institution of fitting importance.

Mr. James Lenox, a citizen of New York, who has for many years been collecting rare and most valuable as well as intrinsically useful books, as also the choicest works of art, within his reach, has resolved to meet the want alluded to, and that in the most munificent way.

The New York *Tribune* thus speaks of it:

"A new public library is to be founded in this city upon a scale commensurate with the magnitude of the intellectual wants of the largest city in the United States. A bill was introduced in the Senate at Albany on Wednesday, incorporating the Lenox Library, which is to

be a free gift to the city by Mr. James Lenox, of the Fifth avenue. The munificent founder proposes, it is said, to convey to trustees a block of land somewhere between Seventy-second and Seventy-sixth streets, opposite the Park, as a site for the building, and to give \$300,000, or any larger sum that may be needed, to erect it. In addition to this, he will, it is said, transfer to the trustees his entire collection of statuary, paintings and books as a beginning for the library, and he declares that no further sums of money shall be withheld that may be demanded to make it the finest library in the country.

"Mr. Lenox has been known for many years as a liberal and most intelligent collector of priceless volumes and rare works of art, and his private library is probably the most valuable in America. These treasures, gathered from the richest storehouses of Europe, and all his rarities of American bibliography, for so many years guarded with a jealous eye and arranged upon his shelves with a loving hand, are now, it seems, to be transferred to a library which shall belong to the people. It would be difficult to overestimate the importance of such a gift as this which Mr. Lenox intends. Splendid in itself, it is, perhaps, of even greater value as an example to other men of affluence, and as likely to lead to future endowments for its own extension.

"The Presbyterian Hospital, in course of construction on Seventh-street, at a cost of \$1,000,000—another benefaction of Mr. Lenox—furnishes a proof of the comprehensive philanthropy of the man, and the thoroughness in which he aims in his charitable enterprises."

Over one hundred new houses were erected in Cape Girardeau, Mo., the past year.

TRINITY CHURCH, CHARLESTON.

THIS time-honored temple of worship, the oldest Methodist Church now in the city, has recently undergone thorough repairs, and considerable alteration. Old Trinity was burned in the great fire of 1838, and the present structure erected in 1839, when labor and material of every description were very high. Hence although the Church was very plain and marked by a total absence of every species of architectural ornament, it nevertheless cost a large amount, burdening the congregation with a debt which it took about ten years to liquidate.

Simple and plain as the Church was, however, it suited the wants of the members and congregation, who for a whole generation worshipped within its walls. Many of the greatest lights of the Southern branch of the Methodist Church have preached here to large, earnest and devout congregations. The sweet spirited Bishop Capers, Chrysostom of Charleston Methodism; the venerable Bishop Andrew, patriarch in Israel; the eloquent and courtly Bascom, the learned Dr. Thomas O. Summers, the classic Bishop Wightman, the brilliant Bishop Pierce, the eloquent Dr. Whitefoord Smith, and hundreds of others we might name, have made those walls resound repeatedly with the lessons taught by the Holy Word.

Like every other church edifice in the lower part of the city, Trinity sustained considerable injury by the bombardment during the last year of the war, necessitating a considerable outlay in 1865 to repair it. Only what was most necessary was done, and no effort made towards a general improvement of the appearance of the building, external and internal, until a few months since, when a Committee was appointed, who have had this matter in charge, and who, we hesi-

tate not to say, have discharged their trust in a most praiseworthy manner.

Trinity will be rededicated on Sunday next, the 16th. Bishop Pierce and Dr. Whitefoord Smith are expected to conduct the services; and, we learn, there is some probability also of Bishop Wightman being present.

In attempting to enumerate the changes and improvements that have been effected, we scarcely know where to commence. In front, we find that new doors have replaced the old ones. The transom lights over the old doors have been removed, and the new doors (with eight panels) extend the entire height of the doorway. Caps have been put on the windows on the outside, a flue built in the centre on the Eastern side of the house, so excellently contrived as not to mar the general harmony of the building. The entire outside is neatly painted, the fence walls repaired and white-washed, and the church-yard and grounds adjacent are to receive attention in the course of a few days.

On entering, the eye is attracted by the inscription, near the door: "This is none other but the House of God;" and over the pulpit: "Thou God seest me."

The front gallery has been shortened fourteen feet, and a new balustrade placed all around. The gallery is supported by fourteen iron columns, of a very tasteful pattern, cast at the foundry of W. S. Henerey, Esq. The windows have all been lowered ten inches and beveled four inches. The old sashes, containing fifty-six lights each, have been changed for new ones of sixteen panes, three sashes to each window.

The pews have all been remodeled after the style of those in the Citadel Square Baptist Church. Fifteen pews have been taken out, widening the space and making them much more comforta-

ble. The aisles also have been widened one foot each.

The old pulpit has been removed and a new platform pulpit substituted, eighteen and a half feet long, and ten and a half feet wide, with a moveable pulpit-stand. An urn on each side front corner upon the plinths, for holding bouquets of flowers. The entire wooden work in the rear of the pulpit has been changed. The old plain Doric has been made to give place to two columns with Corinthian caps, all tastefully tipped with gold. The windows of stained glass admit a "dim religious light." On each side is a bracket with three burners each. The pulpit will be further lighted by two moveable stands.

The pews are painted in imitation of oak, and the walls panelled. The ceiling is laid out in moulding and scroll work, with a very handsome centre piece in white and gold. The sides of the platform are painted in panels in china gloss and gold. Altogether the effect on the eye is very pleasing, and we do not know of a Church anywhere, presenting a finer aspect than does the interior of Trinity Church.

The carpenter work was done by Messrs. Welling & Dillingham; and the brick work and plastering by Mr. C. T. Johnson, who is also the contractor of the entire work, except the painting and gas-fitting. The painting was done by Mr. J. E. Brower, assisted by his father, Mr. Wm. Brower, long known to this city as a most cunning artificer. The gas-fitting is the work of Messrs. Brown & Hyer. There will be about sixty-two large burners, so that the church will be well lighted.

The new stairway on each side to the gallery is one of the improvements that was most needed. The committee are in correspondence with a Boston organ builder for a fine instrument; the one now in use being a small organ formerly belonging to the Wentworth-street Lutheran Church.

The basement contains a large lecture

and Sunday-school room, which will comfortably seat 350 children. This room is amply lighted with gas. Attached to it is the Sunday-school library room; also a room for the infant class, and two rooms for the Bible classes.

The entire building, above and below, is heated by a hot air furnace, on the latest and most approved plan, furnished and put up by Mr. McDuff Cohen.

We congratulate the congregation on their finely renovated house of worship, and wish them and their pastor, Rev. W. P. Mouzon, a pleasant and prosperous year.—*Charleston Courier*.

WEALTH OF OLD ROMANS.—According to Cicero, the debts of A. Milo amounted to about \$28,000,000; Julius Cæsar, when setting out for Spain, is reported to have said himself that he was \$10,000,000 worse than nothing. When he first entered Rome, after crossing the Rubicon, he took from the public treasury \$5,500,000, but at the end of the civil war put over \$24,000,000 into it. He purchased the friendship of Curio with a bribe of over \$2,500,000, and of the Consul L. Paulus with half that sum. Crassus was worth in real estate over \$8,000,000, and about as much in money, furniture and slaves. Seneca was worth over \$20,000,000, Lentulus the augur over \$16,000,000. Augustus raised by testaments of his friends nearly \$161,000,000. Tiberius left at his death nearly \$109,000,000, which Caligula spent in less than one year; and Vespasian, at his succession, said that he required for the support of the state over \$1,614,000,000. Nevertheless, though greatly enriched by its conquests, imperial Rome never came into the full inheritance of the chief wealth of the East, and large quantities of the precious metals must have remained excluded from the calculations of ancient historians.

A new city hall in Cedar Rapids town.

FINE ARTS—PICTURE SALES.

THE rapidly growing taste for the fine arts has occasioned a great extension of the picture trade in New York. Vast sums have been invested in it by dealers who make this city a central point for the distribution throughout the country of a multitude of works by native and foreign artists. A few years ago, when a market for productions of this kind could hardly be said to exist here, lumber rooms, inconvenient halls, and even old churches used to be temporarily hired for occasional picture sales. But now there are at least three spacious, elegant, well ventilated and well lighted galleries specially and permanently devoted to exhibitions and auction sales. In addition to numerous picture stores of an inferior class, several "Art Buildings" have arisen on Broadway and Fifth avenue, equaling if not surpassing some of the finest similar establishments in London and Paris.

Most of the picture sales, however, which have taken place during the present season have been characterized by discouragingly low prices and by an unusual lack of eagerness on the part of buyers. We are convinced that this is owing less to scarcity of money than to the fact that so many picture dealers, underrating the improved standard of public taste and overrating public gullibility, have not hesitated, in their haste to get rich, to glut the market with trash from the workshops of wretchedly paid foreign copyists. At all the great art centres of Europe, and particularly, it is said, at Dusseldorf, their agents have even succeeded in inducing certain artists of high reputation to connive at schemes for swindling the American public, and to place, or permit to be placed, their names on copies of really valuable pictures. These copies are brought over here and, encased in gaudy frames, are fostered as originals on inexperienced and credulous buyers. This has become a wholesale and retail swindling business. It costs the dealers

so little to obtain and import these bogus productions that their profits are enormous. Many of the copies are mere daubs; but some of the counterfeiting copyists regularly employed by the dealers have sufficient technical skill to make passable pictures at a rate of remuneration which would be utterly inadequate, even for them, if they were living here instead of abroad. No American artist would wish or could afford to do the same work at the same price. Consequently the greater the demand which can be artificially stimulated for foreign copies the less encouragement is given to native artists to make either copies or original paintings. Thus fraudulent picture dealers get rich, while, so far as they are concerned, the artists may starve. Happily this gross injustice needs but to be exposed to be condemned and remedied. Already purchasers are suspiciously avoiding picture sales of the Peter Funk order. They will do wisely if, henceforth, and especially during the holidays, they confine their patronage to those first class dealers who merit it by offering, both at private sale and at auction, works of undoubted value by the best European and American painters. There must be not a few of such works among the two thousand pictures comprised in the collection of a late eccentric Boston millionaire, and which are soon to be sold at auction in New York. This will be an extraordinary picture sale.—*N. Y. Herald.*

The supervising architect of the treasury department speaks of the necessity of a new custom house and post-office at Cincinnati; also of a further appropriation to complete the one now building at Cairo, Ill., and the marine hospital in Chicago.

The buildings owned by the Whipple file company, at Ballardvale, were sold at auction Wednesday, by order of the assignees, for \$25,000. They originally cost between \$300,000 and \$400,000.

BRONZE DOOR TRIMMINGS.

THERE are few more acceptable improvements in the internal finish of dwellings of a superior class than are to be found in the varied and beautiful bronze trimmings which are now coming so generally into favor. Time was when brass furniture was the extreme of fashionable finish in our very best houses; to which silver-plating succeeded and retained its hold in so determined a manner that it was conceded that the spirit of refinement could no farther go. But, ah, that spirit is far too progressive to dally long with any device; and so we find, that the murmurs of the laboring "helps," whose business it is to keep things bright, especially door trimmings, were at last heard by the domestic deity that presides over all such things, and forth came an improvement which cannot fail of pleasing, not alone the order of domestics alluded to, but the tasteful public in general. We mean **BRONZE DOOR TRIMMINGS**. These require comparatively little attention; always retaining their peculiar appearance, and giving an air of elegant finish to the doors they are used on, whether as locks, escutcheons, fronts, striking plates, or highly decorated hinges. And in this matter of decoration the bronze work possesses a great advantage over silver-plate or brass furniture, inasmuch as the highest degree of ornamentation can be attained without the extra cost that would attend the former, and without the labor of cleaning which such would necessarily incur.

We have recently received a handsome volume of some three hundred pages, profusely illustrated, from the great **RUSSELL & ERWIN**, manufacturing company of New Britain, Connecticut, being a fully descriptive catalogue and price list of the bronze and other works of that enterprising firm, and we must say that

the designs are excellent throughout, and many of them novel in their line.

To the profession generally this perfecting of bronze furniture or trimmings is most decidedly a boon; for it puts it in the power of the Architect to carry out in the most minute accessories, the peculiarities of the style he has chosen, and which hitherto has been, of necessity, neglected because of the want of the very system of manufacture which we now hail as a desirable advent. The study of the ancient bronzes is now beginning to be very general amongst designers and artizans in this country, as it has been for some years back in Europe; and we are glad to see that the **RUSSELL & ERWIN** manufacturing Co's efforts, to effect a position for it in our country, are meeting with that success which gives earnest hope of progress hereafter.

Architectural Iron Works throughout the country are fast improving the taste of our people by the casting of such designs as are worthy of reflection as well as of notice; and this is especially remarkable in modern fancy gates and railings, or fences. We refer to these merely to show that much is being done in the way of improvement in the executive department of design, and that the advance is being carried into those inside trimmings of our houses which so constantly meet the eye of the enquiring mind.

That bronze cornices, bronze plinths, bronze architraves, will soon find a place in the architectural embellishments of our mansions, we have not the slightest doubt. In Ecclesiastical Architecture these bronze trimmings for doors are peculiarly applicable, and very desirable. In them the choicest, quaintest, and most architecturesque of designs can be very expressively carried out, in perfect detail.

Wyoming Territory, January 12, 1870.

EDITOR OF THE ARCHITECTURAL REVIEW.

CHEYENNE CITY, the Capital of Wyoming was, on the first of July, 1867, a spot upon "the great American Desert," unknown to the civilized world. It now has a population of nearly 3,000, and enjoys a steady, healthy increase. It is five hundred and sixteen miles west of Omaha, the grade averaging eleven feet to the mile. It is at the base proper of the Rocky Mountains. The railroad grade being eighty feet to the mile for thirty miles west, where it strikes the summit of the Black Hills, eight thousand two hundred and thirty-five feet above the level of the sea. The heaviest class of locomotives are required west of this point; hence the necessity of the large machine shops which the Union Pacific Railroad Company have erected, and are increasing at this point. Three railroads radiate from Cheyenne, one to the Pacific, another to the Atlantic, and the other to the Gulf of Mexico, via, Denver, (there being two hundred miles staging over the latter). Daily trains run on the Denver Pacific Railroad to Evans, fifty-eight miles south of Cheyenne, leaving only four hours staging between here and Denver.

The town affords as splendid a brick block, two stories high, (the material manufactured here), as can be found in almost any town of its size in the East. The marvelous growth of this town is only a fair example of the rapid development of this, the youngest territory in the Union.

S. H. W.

[In presenting to our readers the foregoing communication of our correspondent, Mr. S. H. Winsor, we would say that we wish our other professional allies in all parts of the Union would follow the example here set, by our far western friend, and send us any information within their power which may be of interest to our patrons.]

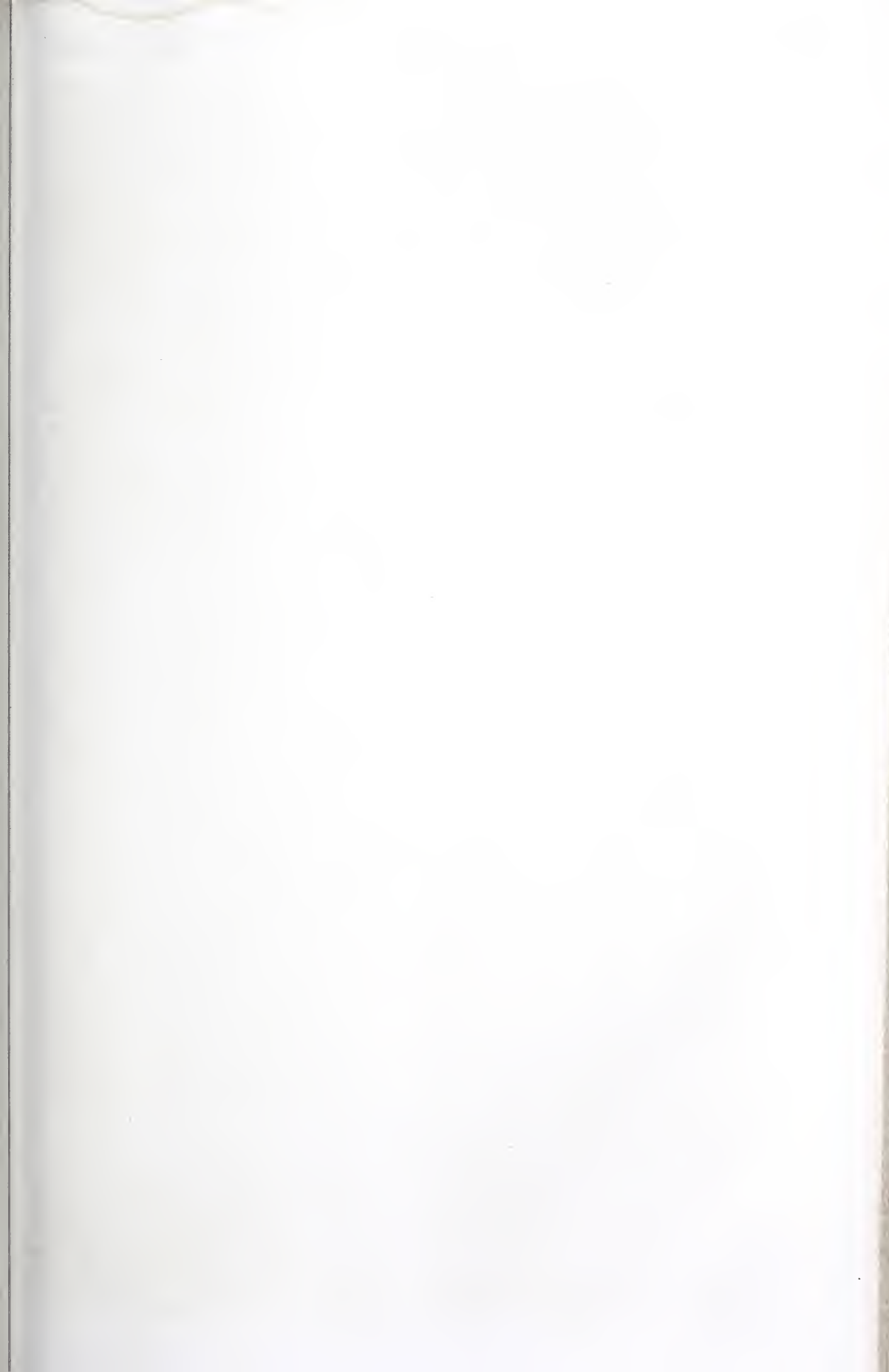
The old wigwam lot Chicago will be the site of an iron block.

A NOVEL CONTRIVANCE.—Mr. William Ginnodo, a prominent builder of Philadelphia, has just completed an invention, for which he has made application for a patent. It is a simple yet very effective fixture for controlling the opening or closing of outside shutters, and of securing the same. It gets rid altogether of the rings, bolts and hooks and eyes, which from time immemorial we have been using on our shutters.

The arrangement is very simple, and cannot fail of meeting with public favor. It consists of two sliding bars fitted together, one grooved into the other, and both hinged to the shutters; these run into each other on closing the shutters, and slide apart on opening the same. The shutters can be secured at any required angle of opening, by simply turning a thumb-screw, which secures the bars together. It has the appearance on the inside, of a bolt across the closed shutters. The length is about seven inches less than the entire width of the window, that is to say,—this appliance is three and a half inches less at each end than the width of the closed shutters.

The great advantage of the invention lies in the facility with which the opening, closing, and fastening of the shutters, can be manipulated at all times and seasons, avoiding the annoyance of a rainy or windy day, which renders our old system so very unhandy and uncomfortable. Mr. Ginnodo has tested the action of his shutter adjuster to the perfect satisfaction of all who have seen it; and when we say that it will be economical, as well as practically useful, and not liable to get out of order, we think we can safely predict its wide spread popularity.

Two architects were occupied in building the recently completed opera house at Vienna. The structure was criticised with some severity, whereupon one of the architects hanged himself and the other jumped into the Danube.





LINCOLN STATUE
for UNION SQUARE, N.YORK.
Cast in Bronze by ROB^T WOOD & C^O, PHILAD^A

BROWN Sculp^d

L. Hagg Lith.

BRONZE STATUARY.

WE are glad to see that the art of Sculpture in the statuary line is coming rapidly into notice in our country, and that such art-work, cast in bronze, is likely to become popular amongst us. Hitherto all the bronze casting executed on American orders has been done in Munich, and in fact the majority of such orders there are American. However, we are at last beginning to awaken to our own interests in this, as in other matters of art, and find that we have the facilities and capability for executing our own works if not exactly as well as the men of Munich, at least respectably for the tyros of America.

A colossal bronze statue has just been cast in this city, of which we give an illustration, representing President LINCOLN. It is to be located at Union Square, New York, occupying the south-west corner, the equestrian statue of WASHINGTON occupying the southeast.

The figure is nearly eleven feet high, weighs about two thousand six hundred pounds, and cost some \$6,000; but when placed in position and surrounded by its fence work all complete, will cost \$22,000, which sum has already been raised by the citizens of New York. The pose is natural, the likeness good, and the whole work very creditable. Mr. H. K. Brown was the artist, and the casting was superintended by Mr. Achille Bureau, a French expert.

A statue of General Scott has been commenced by the same artist, Mr. H. K. Brown, to be also cast in bronze, in this city, and to be located at West Point Military Academy.

We are glad to see that American art is showing its hand in this matter of bronze statuary, and we fondly hope that the patriotic spirit of our people will so far sustain the enterprise as to soon leave it quite unnecessary to send to Munich.

THE NAVY YARD.—In 1862, while Admiral (then Commodore) Dahlgren was ordnance officer at the navy yard, Washington, he caused plans for an elaborate building, to be used as an ordnance foundry, to be prepared by the well-known architect, Adolph Cluss. The plans were adopted, and soon the magnificent structure was erected. About \$200,000 was expended in its construction up to the time that the Admiral left the yard. Then the work ceased, leaving the building in an unfinished condition, and it has so remained to the present time. We are glad to announce that since the Admiral's advent as commandant of the yard he has been endeavoring to obtain the necessary order to finish the work, and by his persistent efforts has succeeded, thus insuring steady work to a large force of mechanics and laborers for some months to come.

The building is in the Norman style of architecture, and is a splendid structure. To complete it in accordance with the plans and prepare for its occupation the estimated cost is \$49,793. The necessary requisitions have been made, and the material to complete it will soon be on the ground. An addition on the south side is to be built, in dimensions one hundred and forty-seven feet long by twenty-seven feet wide. This addition will contain an engine-room, two boiler-rooms, store-rooms and ovens. There will be six furnaces in the entire building, with all possible improvements for the casting and finishing of heavy ordnance. There will be a large lathe for turning guns, hoisting apparatus, etc.

The work necessary to complete the building will be under the supervision of Gen. F. A. Stratton, civil engineer of the yard. The first work that will be done when the foundry is completed will be the casting of a 9-inch gun.

THE N. Y. SUN BUILDING.

THE old established cheap journal of the Empire city having passed into the hands of its present proprietor, in 1869, it was deemed necessary to seek a larger sphere of action, and accordingly old Tammany Hall was purchased, and refitted in such a manner as to make a roomy, well lighted, and attractive publication building, so judiciously apportioned to the wants of its calling, as to leave nothing needful. The lofty Mansard roof, which now rises high above the former level of the flat roof of old Tammany, is occupied by the compositors, and is roomy, airy, and well lighted. The many rooms for editorial and other purposes are remarkably well adapted to their several requirements, and the underground offices for printing presses, steam engine, etc., are well worthy of notice.

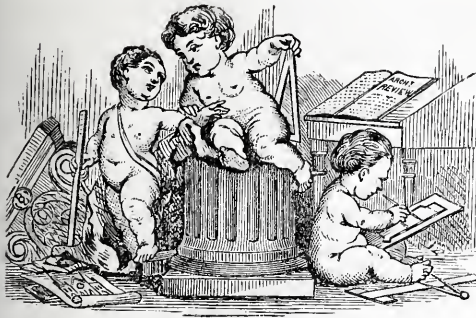
Of course it is not in our line to speak of more than the building, but as our readers may desire to know somewhat of the presiding genius of this well known orb, we will give an extract from an exhaustive account of the *N. Y. Sun*,—its rise and progress, by Oliver Dyer:

"Mr. Dana is one of the largest stockholders in the Company, and the editorial monarch of the establishment. His sway is imperial and despotic. No one does or can call *him* to account. He has had large experience in the newspaper affairs, in subordinate as well as in controlling positions. He has been reporter, city editor, managing editor. New York correspondent, Washington correspondent, Paris correspondent, and Foreign correspondent generally. Like Napoleon, therefore, he knows his profession through all its grades, and can judge and do justice to all his subordinates, and pity all their woes because he has felt the same. He has a wide knowledge of public affairs, and also of business, commercial, and scholastic matters; has travelled much both in Europe and America; speaks the modern languages with fluency; has an intimate acquaintance with

many of the leading minds of both hemispheres; is familiar with literature, philosophy and metaphysics; sympathises with the progressive and ameliorating movements of the times; has always been an audacious and plucky newspaper belligerent, but fights without malice, and is a generous conqueror; receives the hardest blows with serenity of countenance and of spirit, as though he heard gentle angels whispering, saying: 'Peace, Charles, prithee peace! Possess thy soul in patience and bide thy time, for that vain man weareth a scalp where-with, in the Providence of God, thou shall ere long adorn thy wigwam!' and he doth possess his soul in patience, and he also biddeth his time; and finally, like a true journalist, he conspicuously takes the scalp of the offender at the very time it would be most awkward for the victim to appear in society bereft of that ornamental hereditament.

"Mr. Dana is a hard worker. The *Sun* is his pet. He loves it and is proud of it. He keeps a vigilant eye upon everything; and, like his subordinates, is ready to do any piece of work whatever, that may come to his hand. His literary and editorial executiveness is surpassingly prompt and decisive. This helps him to go through his work with a celerity which relieves it of much of its burdensomeness. He is genial and companionable with his assistants; but no one can more effectively assume the imperial role when distinctions of position should be made apparent and the lines of order should be sharply drawn."

On the 3rd of November, 1869, 87,800 copies of the *Sun* were sold, and the receipts for the sales alone were \$1097.50. This would show the amount of business doing, not to speak of the advertising department, which is large and increasing. An evidence that capital, skill, and energy, can make the *Sun* more widely enlightening in a literary sense than ever it was before. There are several instances of successful journalism, but not one more remarkable.



EDITORIAL ITEMS AND CORRESPONDENCE.

SPECIALISTIC JOURNALISM.

WE feel a peculiar satisfaction in giving to our readers the following truthful observations of our talented cotemporary the *Scientific American*, because we feel that they apply with not a little force to our case. We started the *ARCHITECTURAL REVIEW* as a specialistic monthly magazine, and find, from its increasing success, that we were not mistaken as to the fact of there being a want of such a publication.

For ourselves we would call the attention of our readers to the expressive fact that we this month appear in a complete new outfit of type, etc., although preserving as nearly as possible the pattern of the cast off garment.

We give the article *in extenso*, because we know that our cotemporary says not one word more of himself than he is most fully intitled to say; and because we are nationally proud of his success.

"No one who watches the growth and progress of journalism can fail to mark the tendency of the age towards the establishment and support of publications devoted to specialities. Newspaper and periodical literature is the most powerful educating agent of the nineteenth century. Compared with it, institutions of learning, from the university down to the free school, inclusive of all intermediate grades, dwindle into insignificance. The pulpit has, to day, far less influence over the public mind than the religious press. For instruction, the masses turn to the daily, weekly, and monthly publications.

"Now, it is manifest that, in any journal or magazine, endeavoring to cover all fields of information, and to teach on all topics, there must, of necessity, be much in which nearly every one of its readers will feel little or no interest. Some will read the sporting news and discussions on breeding trotting horses. Others will turn in disgust from such things to topics of moral and political reform. Some will feel a deep interest on account of a new variety of potato, while many, not relishing potatoes, will prefer politics. It is seldom or never that a man can be found so omnivorous for information as to follow, with interest, all topics.

"Such a publication will necessarily find it impossible to give as full information on any topic as those who make that topic a special study, require; and so a journal, devoting its columns to the full and complete record and discussion of events and discoveries in one particular field finds favor among those who delight in that field more than any other.

"The demand for publications of a special character arose in this country many years ago. At first it was confined, more particularly, to scientific, religious, and sectarian publications, but we are now in the full stage of specialistic journalism.

"One of the earliest established as well as one of the most successful of American papers of this class is the *Scientific American*. Its success is mainly attributable to the fact, that at the outset, it recognized the demand for a paper devoted to the topics which constitute its specialty, and, that while it has ever been a medium of instruction to the masses, it has never allowed itself to lose sight of the fact that, to instruct the masses, it is necessary not to assume a greater standard of general information among them than they really possess. It has, therefore, been an eminently popular journal, and its gradual improvement, since its foundation, is only the reflex of the general intellectual

improvement among the masses, to which its efforts have doubtless contributed as much as any other paper ever published on this continent.

"The tendency to specialistic journalism will, undoubtedly increase, and, with the increased diversity of industry and knowledge. To what length it will ultimately be carried, no one, can at present, predict, that its effects upon the profession of journalism is altogether salutary appears almost self-evident to us. It gives us men who concentrate their abilities upon the study and discussion of a few subjects, instead of dispersing them over wide and unlimited religious of thought, and consequently gives strength and comprehensiveness to their productions."

ERRATA.—We regret very much that our valued correspondent, Mr. H. W. S. CLEVELAND, should have ample cause of complaint for ill usage of his essay in the January number. Speaking of Arboriculture as a science, practically unknown, the types have made him say "Agriculture as a science is in this country practically unknown." Also on the same page *Kalmia* is made to read "*ralmia*," and hop-hornbeam is printed "*hop*, hornbeam."

All these errors are very annoying, not more so to the writer than to us, and the only apology we can offer for them is in the fact, that there occurred just at the time of setting up the matter in question, a change in the printing department of the REVIEW. We now have the type setting done under our own direct supervision, and will be sure in future that errors shall not go undetected, and that when they are detected they shall surely be corrected.

THE photograph of the porch of the Church of the Messiah, corner of Park avenue and Thirty-fourth street, New York, has been received from the Architect, CARL PFEIFFER, Esq.

Williamsport, Pa., Jan. 5, 1870.

EDITOR OF THE ARCHITECTURAL REVIEW.

DEAR SIR: Williamsport being the largest lumber market in this country, I have thought it would be interesting to your readers to have an outline of its extent and advantages.

In the first place then it is situated on the west branch of the Susquehanna, a river which extends back, for over one hundred and fifty miles to the Alleghenies, through a region picturesque in the extreme, and densely wooded, in great variety, from oak, beech, maple, etc., to eucomber pine, and hemlock, in primeval abundance; besides which its geographic centre, and connecting railroads, with nearly equal distances from the large cities, New York, Philadelphia, Baltimore, Pittsburg, and the port of Erie, Pa., (from which it can ship supplies to the far west or be supplied from the North,) render it unsurpassed advantages for this trade, and with the enterprise and bold spirit of its citizens, Pennsylvania's sister cities must look out for their laurels, or some day Williamsport will have a business that will bring to its protecting arm a population outnumbering even that of our sleepy metropolis.

Much of the lumber comes down the river in log rafts, and of course there are mills here of corresponding dimensions to the immense trade to work up these *floating forests* (so to speak), into building timber, and for commercial purposes. One of these mills now in operation has lately been erected on East Third street, by the enterprising gentlemen, Messrs. Runkle, Housel & Beard, who by the way are practical business men. It is built of brick, and is of gigantic proportions, is heated throughout with steam, and is finished in a substantial and elegant manner. It contains, besides seven different saws, improved machinery for making doors, sash, blinds, brackets, mouldings, flooring, siding, and every thing else that is needed by the carpenter and joiner, a capacious drying kiln, a fifty horse-power engine, and has ca-

capacity for turning out 30,000 feet of lumber daily. Of course there are many others here which help to make up the extensive business of the locality, but I give a description of this particular one as it is lately put up and is one of the largest and best in the State.

It is hard to realize that Pennsylvania, so long settled, still has resources so vast; yet you have only to make a visit to this region to see for yourselves that the half is not told you. How is it then, that, in the face of this fact there are calculating cynics, who are constantly telling us in years and days, how soon we shall be without coal and timber; as reasonably might they calculate how soon they could annihilate the earth by shovelling it off into space. Pennsylvania's resources themselves are enough to cancel the national debt multiplied by 10,000. Now, wishing the Journal a happy and prosperous New Year.

I am, Yours truly,

A TRAVELLER.

was struck more than ever with the brightness and truth of the good old saying, "There is nothing new under the sun," for there I found a notice of a graining machine which you say is the invention of a citizen of Illinois, and has been in use these two years in this country. Now, sir, I used a machine, or rather I should say, three such machines, precisely the same as your illustration, and exactly according to the description in *Morgan's Trade Journal*, while in the employ of David Pirie, of 31 Crichton street, Dundee, Scotland, and that was in December, 1861. The machine had been in Mr. Pirie's possession for a considerable time, in fact they were laid aside, from the fact that we could do work faster without them. There may be some little improvement now, but from the cut and the description I am unable to perceive any.

I am, yours,

respectfully,

R. W.

York, Pa., January 6, 1870.

THE EDITOR ARCHITECTURAL REVIEW.

DEAR SIR: Looking over the pages of the December number of the REVIEW, I

We now see the reason why we failed to induce the supposed inventor in Illinois to correspond with us.—[EDS.]

LITERARY MATTERS.

HINTS ON HOUSEHOLD TASTE. By CHARLES L. EASTLAKE, Architect. London: LONGMANS GREEN & Co.—Seldom is a tasteful subject more exhaustively treated, more expressively illustrated, or more enticingly presented in book form than this. Mr. Eastlake is one of those who go into their subject *con amore*, as all who dwell delighted on his pages must feel. In this new country we can scarcely be expected to have that reverence for antiquity which an older history may yet, in the far future, induce us with; but which of us does not feel the natural magnetism that brings the memory down to that "Old arm chair," or even the simple out-door appendage of the

"Old oaken bucket, the time honored bucket,
That hangs in the well."

The specimens of wall-papering are numerous, diversified and charmingly tasteful. In fact the book is a gem in its line, and worthy a place on every bon-doir-table, and library shelf.

BICKNELL'S VILLAGE BUILDER. A. J. BICKNELL & Co., Troy, N. Y., and Springfield, Ill.—A large quarto volume of designs for dwellings of every size, as well as for other buildings, civil and ecclesiastic, in fifty-five scale drawings, on stone; together with model specifications and estimates, by several architects in various cities. It is a very useful work, and cannot fail of giving ideas to those who entertain the thought of building.

CIVIL ARCHITECTURE. By EDWARD SHAW, Architect Henry Carey Baird, Philadelphia.—This old friend and companion has been once more introduced with a new face, and an added treatise on Gothic Architecture, etc., by T. W. Silloway and George M. Harding, Architects. It is brought out, in this its eleventh edition, with an enterprise worthy our industrial publisher, Mr. H. C. Baird, of 406 Walnut street. The typographic dress is new and elegant, the paper of excellent quality, and the engravings—one hundred and two in number, select and well executed. We do not know of a more complete theoretical and practical system of building, containing as it does, the fundamental principles of the art, a monitor for every student as well as a reference for practitioners. The price is \$10. It will be forwarded by mail, free of postage, to any part of the United States.

THE ARCHITECT. London.—We place on our exchange list this ably conducted cotemporary, with a feeling of pride and pleasure at its success. Its contributors are in the first rank of the profession in England, and the learning and critical sense displayed in the paper entitled "The History of Art by its Monuments," from the pen of Sir Wyatt Digby, Architect, are sufficient themselves to show the care and industry with which its writers sustain its character as an authority in architectural matters.

The Workshop Album. E. Steiger, New York.—This is a years collection of select designs from that admirable art publication, *The Workshop*. It is a perfect treasury of the beautiful. The engravings were executed in Germany, and the publication appears monthly in five distinct languages, the English one being edited in this country by Profs. W. Baumer, J. Schnor, and others. The yearly subscription is \$5.40. Address, E. Steiger, 22 and 24 Frankfort street, New York.

Helen Erskine. By Mrs. M. Harrison Robinson.—Philadelphia: Lippincott & Co.—A novel, descriptive of English and Italian life, written in a bright attractive style, and evincing genius.

Holy Grail and other Poems, by Alfred Tennyson. Fields, Osgoods & Co., Boston.

Public Ledger Almanac, from Geo. W. Childs, Philadelphia.

Catalogue of the West Side Library. Alden & True, Chicago.

A Catalogue of Practical and Scientific Books.—Published by Henry Carey Baird, Industrial Publisher, 406 Walnut street, Philadelphia. Useful to all who desire to secure the best publications of the day.

Scientific Journal. Philadelphia: d'Epineuil & Dimpfel.—This is a new weekly which, at its birth, met with a most deplorable accident by fire, the offices being nearly burned up, together with three large shelves of valuable papers. Let us hope that this may be a favorable sign to our new cotemporary, and that success may be the consequence of this smoky advent. Under the exciting circumstances it is surprising that the first number proves so good.

The Canadian Builder and Mechanics Magazine.—The January number comes to us wonderfully improved and giving indubitable evidence of healthfulness. For fifty cents a year it gives twelve numbers filled with matter useful and interesting, original and select, with engravings. Dyas & Wilkins, London, Ontario, publishers.

The Manufacturer and Builder. New York; Western & Co.—The initial number of the second volume is good. The matter is comprehensive and fully up to the special character of the journal.

The Land Owner. Chicago; J. M. Wing & Co.—The January number is, as usual, elegant, readable, and instructive, containing an amount of information seldom to be met with in one publication devoted to a special object.

The American Builder and Journal of Art. Chicago: Charles D. Lakey.—The January number keeps pace with its predecessors.

Vick's Floral Guide, Rochester, N. Y.—A very useful and brilliantly illustrated catalogue of flower and other seeds. Price ten cents. It is worth, for its artistic workmanship alone, double the money.

OLD AND NEW. H. O. HOUGHTON & Co., Boston.—We have received the January and February numbers of this literary launch, and on duly examining the contents have come to the conclusion that it is destined to take an advanced position among our most popular monthlies. It is clearly and tastefully printed on choice paper, and its literary matter is sound to the very core. As to the quaint title, we think it is happily ushered in with the words of the salutatory, "cherishing the memories of the past, to obtain from them a better and happier future, that we may squeeze from the OLD its lesson for the NEW." We have a feeling that just now it would be intrusive in us to offer an opinion as to the merits of each particular paper contained in its very readable pages, so we will content ourselves with advising all to judge for themselves.

COSMOPOLITAN MONTHLY. Edited by Wm. Henry Wyly, Atlanta, Georgia.—We warmly welcome this talented Southern cotemporary to our table, and wish it many, many years more of existence, besides the nine it has so well completed.

In addition to the above, we have only room to acknowledge the receipt of the following:

Hours at Home, for February. Scribner & Co., New York.—The monthly report of the Department of Agriculture, for November and December, 1869, from Hon. Horace Capron, Washington, D. C. The "Printers' Circular," of Philadelphia; The "Horticulturist," and the "Rural American," of New York; "Tilton's Journal of Horticulture," of Boston; the "Practical Farmer and Gardeners Monthly," of Philadelphia, all interesting in their various departments of current literature.

BUSINESS NOTICES.

AUSTIN & OBDYKE, Metallic Roofers, 1705 Chestnut st., Philadelphia, Pa., are the Patentees and sole manufacturers of that most excellent novelty in rain tubes, the corrugated expanding water-pipe. We look upon this as being a very excellent invention, having many advantages; such as perfect freedom from injury by freezing, as its corrugated form gives ample room for expansion when required. A. & O. are also the manufacturers of Austin's Patent Pipe Fastening, an arrangement by which dampness to walls from attached rain-pipes is effectually prevented.

THOMAS HEATH'S Plaster of Paris Works, lately removed from corner of Eleventh and Arch street to 42 North Eleventh street, this city, are well worth the inspection of all lovers of art. Here will be found, besides great varieties of brackets, cornices, ornaments for ceilings and fine specimens of his well known scagliola work, groups of statuary, superior to anything of the kind ever before attempted in this country, from the colossal figures of the Apostles and the head of Jupiter, down to the exquisite statuette of "Una and the Lion." Mr. Heath has fitted up an elegant ware-room and manufactory, with every facility to do an immense business,

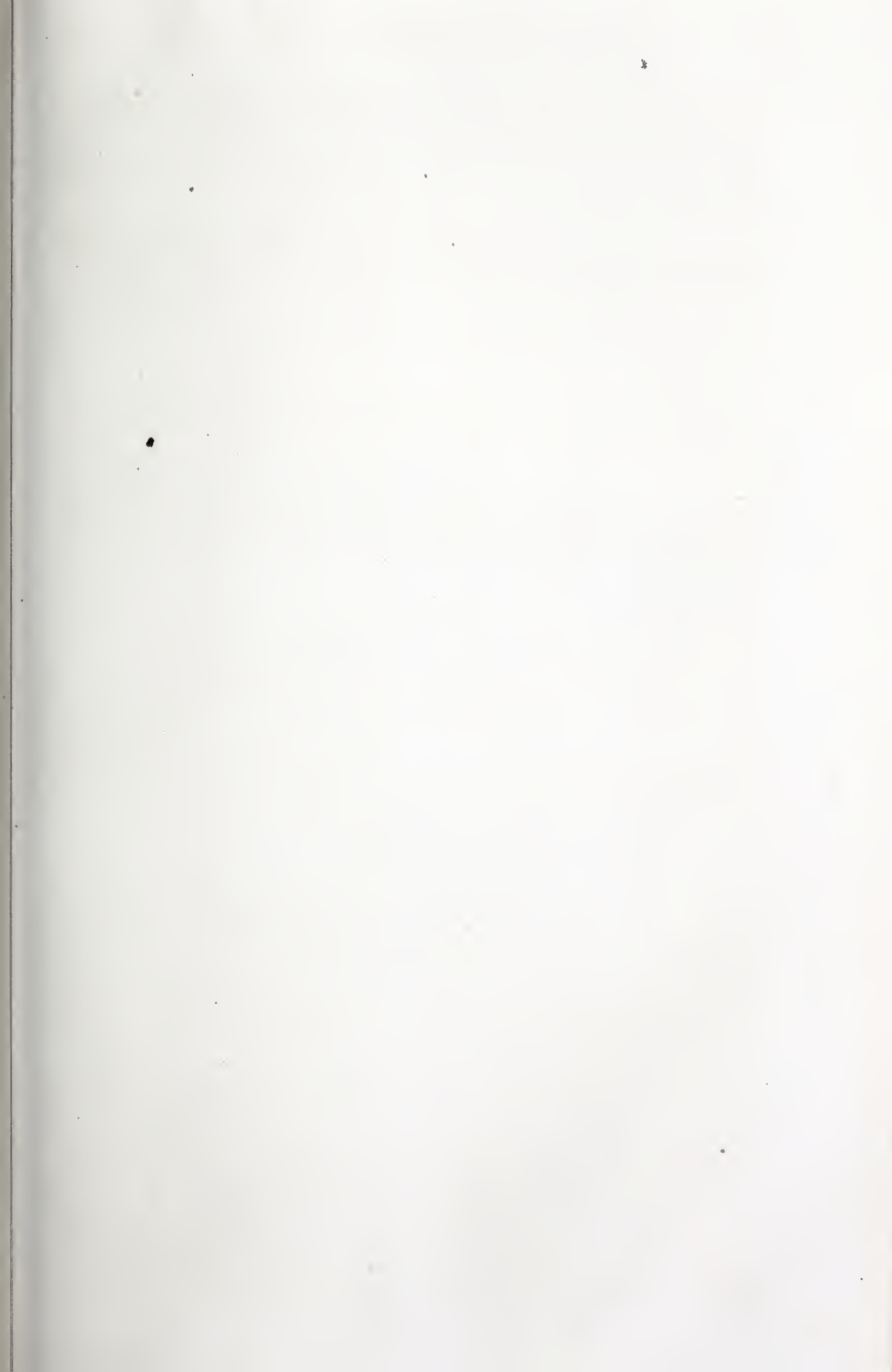
which for his enterprise and rare workmanship we doubt not will come to him.

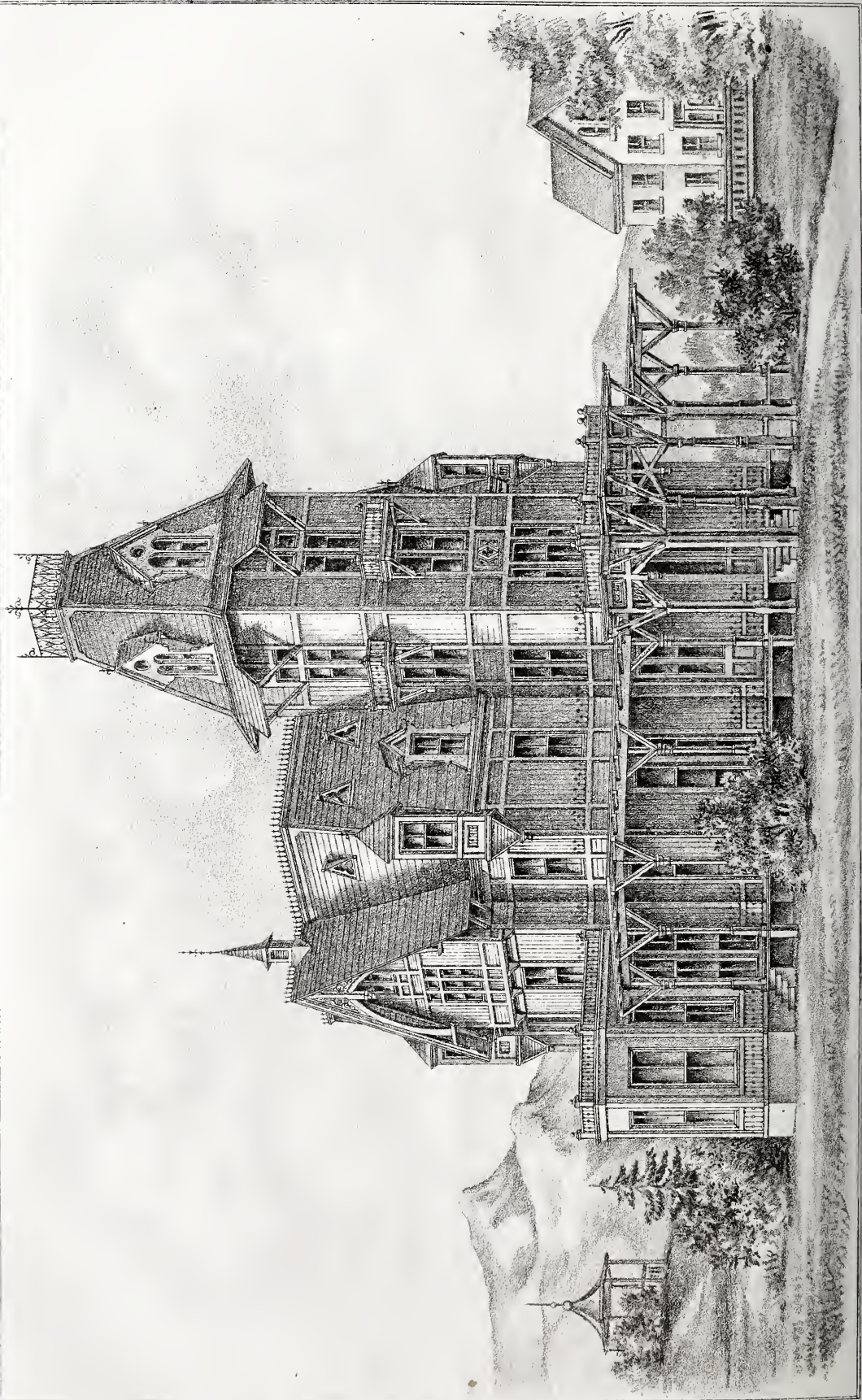
STRUTHERS & SON.—The Marble and Sand-stone Works of this firm, 1022 Market street, are well worth a visit by all who take pleasure in looking on beautiful designs, well wrought out of stone of admirable quality and variety in the monumental forms and in statuary generally.

AMERICAN TUBE WORKS.—It is now an established fact that seamless drawn brass tubes are in all respects most satisfactory, and that no pipe can at all compete with them for strength, durability, neatness, and perfection. Brass tubes are fast superseding the old fashioned plumbing, and will sooner or later stand without a rival. Green & Austin's Patent Seamless Drawn Brass Tubes for water-pipes are now extensively in use, and well deserve to be.

The American Tube Works 103 State street, Boston, are the sole manufacturers in this country.

We ask the attention of our readers to all our advertising pages, feeling confident that at least useful information can be derived from their perusal.





Carl Hentzer Architect N.Y.

A SUBURBAN VILLA

see page 170

THE ARCHITECTURAL REVIEW

AND

BUILDERS' JOURNAL.

BUILDING PROSPECTS.

THE season before us is one of great promise, whatever dearth of office business may exist, as compared with former years. Therefore, there is no reason for despondency among architects generally. There is unlimited capital in the country ready for investment, and there is likewise a growing comprehension of the greatness which vast, chaste and elegant construction confers upon a rising nation like this of ours.

The millionaires of the land appear to have seized the idea of benefiting the toiling portions of their several communities by rendering their situation comfortable and permanent, taking them out of the clutches of rapacious landlords, and placing them in a position more worthy of their manhood, and more honorable to the community in which they live. The suburban villages thus formed will, at some not very distant day, form integral parts of the cities they border on; and thus the benefit conferred on one class tends ultimately to advance the interest of the whole community.

Philanthropy and charity go hand in hand in raising structures for the relief of the unfortunate, and thus we find Architecture called into requisition to make their public works externally ornamental, as well as internally complete. Many such edifices will be constructed soon,

and doubtless many more will follow. Religion is not less ardent in its desire to glorify God in finer Architectural temples, than in the days of simpler ways and less worldly wealth; and every city and village will raise ecclesiastical monuments of greater or less pretensions throughout the land.

Education, the right handmaid of religion, is calling for more and larger collegiate institutions and schools, embracing all that is new and improved in the construction of such. Hitherto Architecture has had but a very questionable share in their design, but this state of things must not last; for, if there is any one place more than another in which a lesson in our art should be taught, it is in the construction of those scholastic edifices of every class, where the youthful mind can be at once brought into sight of its primary lessons, which we all know are so life-durable and so pleasing from their very association with the happy springtime of a perhaps most troublous existence. We would dwell on this subject of inculcating lessons of architecture in the construction of such buildings, did we really think it necessary, but, the thing is so clear in itself that it desires no elucidation.

The great business community meditates many changes, and all of these intended to be improvements—attractive

as can be; for, on attraction depends the public patronage. The day is gone by when simple and unostentatious appearance could cope with novelty of display in winning the great crowd for whose favor every merchant is solicitous. As we import our ever-varying fashions from Europe, so also are we compelled to look there for novelty in store fronts, and, the freshest tone and fabric of silk that makes its first appearance in Paris, is not more desirable than the showy design of a display-window to catch the eye and draw the attention. Our French and English cotemporaries know this well, and architects there are ever studying change. The consequence of this is the advancement of their respective cities in street architecture; for the whole of a building is made to partake of the display of which the store front is, as it were, the illuminated title page.

Domestic Architecture is likely to have a very general demand upon its capabilities in the present year, in numerous new and palatial dwellings, as well as in alterations keeping pace with the state of public taste. In all these prospects of the approaching building season, we see the mighty power for good or evil which our profession has within its grasp. For good, in the seizing hold of its opportunity to build up correct examples, whereon the public mind may study the truth of ARCHITECTURAL DESIGN; and for evil, where the crude uneducated opinionativeness of a shallow comprehension, may institute errors too solidly to admit of a needful correction.

It is the season then for calm reflection on the part of our professional brethren; the breathing time before the battle as it were. In a very few weeks the toil of thought will be upon them, and then there will be no time for such meditation. There is one point we would urge with all the earnestness which we can bring to bear upon it, namely: the necessity, the vital necessity, for independence of judgment on the part of the Architect, in all ques-

tions of art-rule which may arise between him and the person he builds for. Now, it often happens that a client has some peculiar ideas directly antagonistic of architectural doctrine, pure conceptions of his own uninformed fancy, the carrying out of which, in practice, could not be otherwise than subversive of all rule and precedent. In such cases we say it is the clear duty of the true Architect, the lover of his profession, to maintain, with dignity, the laws by which he is governed in his designs, and to rather surrender the commission than yield his judgment, taste, and experience to the mere whim of a would be dictator.

If architects would be true to their principles in this matter, they could greatly advance professional interests; but unfortunately the fear is but too well founded, that if such refusal to stultify themselves is persisted in, some other less conscientious person will be applied to, who will too readily agree to sell his honor and his professional principles for the proffered fee.

There is but one way to guard against such a deplorable state of things, and that is by an associated effort of the profession to unanimously decline acting on any such whimsical requirement, and to refuse acknowledging the claim of any one to be an architect, who would so degrade the profession as to take up a commission which another had declined under the circumstances. The formation of such associations is therefore most desirable as giving protection to the profession generally, and enabling individual members to maintain their independence, and to assert the rights of their profession. Nothing can conduce more to the advancement of the best interests of architecture than a union of action on the part of its professors, and there is no time more opportune than the present for a strong effort in that way. But, to be perfectly successful it must be energetic, prompt, and universal.

OXIDATION OF IRON IN BUILDINGS.

THE fact that iron is used in walls in many buildings for the supposed purpose of bracing, or tying the masonry, is a sufficient warrant for our calling attention to the subject of the oxidation of that metal in situations where it is by two many architects and engineers deemed incorruptable, (such a belief eminently prevails in the case of solid walling of extra thickness), its use being applied chiefly to chimnies and towers, light-houses and the like, where the braces, or iron ties being of frequent occurrence, its disintegration must leave the wall in a very weak state.

Whilst considering this subject, the following apt article in the *London Builder*, comes most welcomely to our assistance, and we take the liberty of transferring it to our pages for the benefit of the building community on this side of the Atlantic.

"The question of the mode in which iron suffers from oxidation, when included in masonry, appears likely to attract fresh attention. It is a subject on which those persons who are familiar with the repairs, or even with the demolition of old buildings, are not altogether without experience. But especial value attaches to the discoveries made on the recent occasion of the examination and repair of the tomb of King Henry VII., in Westminster Abbey, from the fact that both the date of erection, and the subsequent history of the monument, are so distinctly ascertained.

"After the cleaning of the statue of the Countess of Richmond, to which much public attention was directed, last May, the curators of the tombs proceeded to examine the central monument of the Abbey, that of King Henry VII. and his queen, standing, as is well known, in the chapel founded by that sovereign, under the protection of a richly-wrought grille.

"Not only did the effigies appear to be coated and partially corroded in consequence of long neglect, but the altar-tomb itself gave symptoms of dilapidation and decay. Joints yawned, and cracks menaced, and the general appearance was such as is often produced, in similar structures, by subsidence of the foundations. The effigies were therefore carefully removed, and carried into the Eastern apse, or smaller chapel, where they were cleaned, and that with great science. The altar-tomb itself was reverently taken to pieces, with a view to its replacement in its original integrity. It soon appeared that no subsidence had occurred. On the contrary, the tomb had been built on the finished pavement of the chapel, and the portion of this pavement which had thus been protected from wear was in a condition of great and original splendor, being enriched with a diapered pattern, partly polished, and partly pounced or frosted.

"The actual cause of the dilapidation of the tomb then appeared. It was nothing but the oxidation of the only pieces of iron which had been employed by the builders. All the fittings were of copper, with one exception. At each corner of the tomb, as many of our readers will remember, sits a boy angel, in gilded copper. To keep these figures in their place copper bolts were employed, which passed through the upper portion of the ornamental work, and were secured by attachment to four plates of iron, which were built into the tomb itself under the slab on which the effigies rested. These four iron plates, notwithstanding their protection, first by the work of the tomb itself, and secondly by the building which sheltered the tomb from the chief vicissitudes of atmospheric temperature, had developed on either side of each, solid plates of rust, of from three to four times the

thickness of the original iron. The slow formation of this oxide had acted as an irresistible wedge, riving the fabric asunder, and threatening in course of time the entire overthrow of this noble monument.

"Specimens of these plates of oxide, as well as one of the original iron plates, were exhibited at the meeting of the Royal Archæological Institute, on the

second of July last. The dangerous metal has now been replaced by plates of copper; and the tomb has been restored to its original beauty. But the lesson as to the conduct of iron when included in masonry or in mortar, even under circumstances which might be presumed to be more than ordinarily favorable, is not one of which any prudent architect or engineer will lose sight."

FIRE-PROOF CONSTRUCTION.

THE attention which has been drawn in our day to the great subject of immunity from destruction by fire, has caused many architects to make it one of special study. It is really a dreadful thought that life and property are at the mercy of mere accident; and it is almost inconceivable that science should have so signally failed, up to the present, in rendering buildings fire-proof. It has been relied upon as a fixed fact, that the combination of iron and brick, or stone, has effected the desired purpose at least for warehouses, and all buildings used for storage, where wood is not a necessary material. This, however, has proved to be a fallacy, as we have seen in the utter destruction by fire, of extensive warehouses, where combustible articles were stored. For instance, the destructive fires in New York, some four years since, where cotton in immense quantities was consumed from the mere natural action of spontaneous combustion; and in the city of Philadelphia last year, when whiskey, of age and consequent value, amounting, it is said to a quantity equal to half that of all the good ardent spirits in the whole United States, was lost by an accidental conflagration bursting forth. In all these cases we now allude to, iron material proved to be anything but fire-proof. The bars of that metal were twisted and contorted; the sheet-iron buckled up and rolled off of the roofs, and the very precautions taken

to make the buildings internally fire-proof, actually gave them all the attributes of a close furnace or stove, the violent heat in which, soon overcame the iron, and either melted, or reduced that metal to such an exfoliated state as to render it useless for the purposes for which it was constructed.

In this view of the case then iron is unreliable as a building material, and the question arises, what shall be used to take the place of that metal.

Terra Cotta, or earthen-ware, instead of readily fusing as iron does, under intense heat, becomes all the harder with the baking it thus undergoes. Why then not use either of these?

We have instances of earthen-ware pots being applied to a good purpose in construction in England and in France. As, for instance, in the Bank of England Sir John Soane, its Architect, formed arches composed of inverted earthen-ware pots, which being very light, give no considerable pressure on the piers, and have the advantage moreover of being fire-proof. The same device was made use of by Mr. John Nash, Architect of Buckingham Palace, the roof of the grand saloon being constructed of earthen-ware pots, set on an arched plan, and connected together with cement, the whole being covered with ground plaster in asphaltum. The strength of these pots is very great, especially if they are formed with a flange turning inward,

thus adding to the resisting power at the mouth, which is the weakest point. Suitable designs in pottery can be made of such shape as will ensure positive strength, and secure, as far as can be secured, immunity from the destructive influence of fire. Hexagonal or octagonal forms on the outside, and circular on the inside, with a sufficient thickness, and domicular shape at the bottom or closed end, would give a material which would come nearer to being perfectly fire-proof than iron tie-beams and sheet-iron covering have yet proved to be.

We would not wish to be understood as desirous of driving iron as a material from the position it has attained, on the contrary, the claims of iron are very great, as being a most desirable vehicle of design as well as a strong and durable material.

But, in speaking of fire-proof construction we feel bound to give our opinion without favor; and as we have already spoken on this subject, so we purpose to give it attention, from time to time, with a view to drawing out discussion on it, and of ultimately securing a mode of construction as protective against conflagration as it can possibly be made. That such a consummation were most devoutly to be wished, not alone the profession, but the whole human race would agree; for surely the present state of insecurity in which we live is a reproach to our common sense and common prudence, not to speak of our boasted growth of inventive ability.

While treating this subject of fire-proof construction, there is, it appears to us, one point which has been too much neglected, although often hinted at, and vague suggestions made, which might, if seriously considered, tend to something tangible. We allude to the fire-proofing or rendering incombustible the inflammable materials used, of necessity, in our houses.

Wood is a material which cannot be very well superseded for general build-

ing purposes; and at present it forms a very large proportion in the construction of a dwelling, as well as in the furnishing of the several apartments.

Upholstering too has a considerable share in the rendering houses imminently liable to the great destructive agent; and this latter, as well as the omnipresent material, wood, is susceptible of protective influence if the precautions will be used by those in whose hands the required construction is placed.

Chemistry surely possesses the knowledge of some anti-combustive preparation which might be readily applied to all materials used in building, and the chief requirement, economy, might be secured in its composition; for without economy as a feature, it is in vain to attempt popularizing anything, be it ever so protective.

It must be taken into consideration that any such material, if used in the form of a bath for the submersion of timber, plank, etc., in the rough state, should be entirely free from any salivating agent, such, for instance, as corrosive sublimate, an excellent preservative of wood from decay, which was used in what was known in England, as Mr. Kyan's method, but which failed, from the circumstance that joiners and carpenters who worked upon it were salivated, and therefore (very properly) declined the connection.

But, whatever may be the mode adopted; or let the chemical composition be what it may, actual practice will soon decide whether it is suitable to the required purpose, and not injurious to those who work on it. Certain it is that a fire-proof material is wanted, and if wood can in any way be rendered incombustible at no great expense, it will be the most acceptable material, because it is so easily procured anywhere throughout the Union, and because the greater portion of the people use it as a material peculiarly adapted to their wants. In buildings of large size other and more expensive materials are desirable.

BRYN-MAWR.

THIS large tract of land in Lower Merion, Montgomery county, owned by the Pennsylvania Central Railroad Company, lying along their road, has been laid out in building lots for gentlemen's residences. These lots are beautifully situated, and contain from one to two acres each. Bryn-Mawr is eight and a half miles from the Market street bridge, one side of it being contiguous to the Lancaster Turnpike. Already wide avenues have been graded, and substantial culverts built across them wherever required. It is well known that the Company have been at work for nearly two years, grading a new route from Athensville westward, for the double purpose of avoiding the many sharp curves, and the wagon road crossings at grade, so frequent, and so dangerous in this populous suburban district. The grading to Rosemont, at the upper end of Bryn-Mawr,* is so far completed, that the track layers are at work at the easternmost end, and the trains will be running early next Summer. This change of route brings the railroad through the new town, at about the middle line of which, will be placed the freight, passenger and telegraph station, to take the place of that at Whitehall. From Whitehall a new public road is about being made, by the way of this new station to the Gulf road.

The plan of the streets is such that the station will be easily accessible from all parts of the town. The main avenues of Bryn-Mawr run from its upper boundary, in a direction parallel, or nearly so, with the railroad, and Lancaster Turnpike, thus leading towards the city. Some fine improvements for gentlemen's residences are now in the course of erection, so that

by early Summer they will be ready for occupancy. It is understood that some ten or a dozen cottages, to cost from five to fifteen thousand dollars each, will be commenced with the opening of the building season. Here a fine field offers, well worthy of the attention of city architects and builders. Churches, halls, and numerous public buildings will shortly be required.

This new town is attracting a good deal of attention. Its location is admirably adapted for rural retreats for our business men, as well as for families, who desire a healthy atmosphere, with the conveniences of a city. The fact of these improvements having started under the auspices of this Company, is a guarantee that the residents will have every facility and convenience for going to and from the city. The location being high and healthy, with the purest water in great abundance, in full view of the hills on the east side of the Schuylkill, and those also of the Gulf; itself, in the midst of a most beautiful and romantic country, though to most Philadelphians a *terra incognita*, is far more attractive than any other retreat in the vicinity of our city. A person residing there, may by the train, reach Third and Walnut streets within an hour; a half an hour being the time to the station, at Thirty-first and Market streets. With an ordinary pair of carriage horses, the distance to this point may easily be driven in an hour. When there (Thirty-first and Market), we may be said to be almost in the very centre of the most elegant and fashionable district of Philadelphia. It is at the same time, on the direct route to its business centre.

As to the means of transit, there is certainly no road out of Philadelphia, that excels, if it equal the Pennsylvania Central in its elegant, comfortable, and safe trains. The cars indeed are the

* Pronounced *Bryn, More*. It is the name of a Welsh town in Merionethshire, North Wales, from whence came the early settlers of this place. It signifies high, or great hill, from *Bryn*, hill, and *Mawr*, high, or great.

admiration of all visitors to the vicinity, along this road. Their regularity and certainty is as reliable as possible in this sublunary sphere. No other locality, at this time, offers anything like the inducements of this section of country, lying to the west and northwest of Philadelphia; and this town of BRYN-MAWR,

from its many attractions of nature and art, must in a few years be the resort of the wealth and fashion of Philadelphia. Many further improvements will be made in the Spring, which will doubtless call in requisition the talents, the skill and artistic taste of our architects, builders and horticulturists. OBSERVER.

POPULAR INTEREST IN ARCHITECTURE.

IT is a very pleasing fact to see the interest in the progress of our profession rapidly extending throughout the entire country, and that many persons who heretofore took no notice of it are now, close observers of all that is put forth in theory or practice by our architects. The members of the profession themselves are evidently aroused to the fact that they have a position to maintain in society, and that the old exclusive system, by which the people generally were held in the dark as to the subject of Architecture, and a veil of mystery hung around it like that which other professions thought proper to hide their art with, can no longer be continued in view of the intellectual advance of the age.

Where there was once Architect some ten years ago, there are now fifty, and in the Southern States alone, where a few years back the designs required for building were supplied by the Eastern and Northern cities, local architects are to be found in every town of ten thousand inhabitants. This is strong evidence surely of the spread of architectural study in the land. We have another proof of the gratifying fact, and that is, the wide circulation which the REVIEW has, and the steady expansion of that circulation. But there is yet one other, and still more cheering evidence of the progress our profession is making, and that is the marked interest in it which is shown by the increasing number of professional and other

contributors to its pages. And here we would pay a debt of gratitude to one of the leading architects of the country, for the exercise of his facile pen and rich experience in our REVIEW, at a time when others of the profession held aloof and left us to make our stand unaided by them. That modesty which belongs to true talent, would we well know shrink from the publication of his name, or we would gladly give it to our readers.

We have recently received promises of local contributions from many parts of the Union, and confidently expect that others will aid in the same way, if it were only to send us an occasional item of local building information.

It is in the power of every architect and builder in the country, to help make the REVIEW what we are desirous it should be, namely; a useful and interesting vehicle of architectural information. Such is the interest of all connected with the ancient, honorable, and beautiful art we in common uphold and venerate. If then, architecture has made such an advancement in our day, what may we not look for in the future? Our history lies more in the future than in the past, and it is the duty of every lover of the art to make its study the one great effort of his life, and lend an aiding hand to all who seek an intimate acquaintance with its characteristic features.

The community at large are more interested in the progress of Architecture than is supposed.

ARCHITECTURE IN ILLINOIS.

FREEPORT COURT HOUSE.—SEE FRONTISPIECE.

THE States of the Great West have all a peculiar claim on the attention of the whole nation, and none more so than Illinois, whose young giant city of Chicago has put forth such wonderful claims to metropolitan standing, as to throw entirely into shade far older cotemporaries, who have hitherto struggled for the same eminence with all apparent prospect of ultimate success.

The State Capitol at Springfield, lately commenced, is another mark of her prosperous progress; besides which, we find new and elegant structures springing into existence all through the State. Nor are these buildings merely temporary, but,

“With the flash of the gem,
Its solidity too.”

Public structures well designed, soundly and permanently built, are to be seen in many of the towns, whilst others of still greater pretensions are now commenced, and will be completed this year. Among these and in the foremost rank, will stand the Court House just finished, of Freeport, the capital city of Stephenson county. This thriving place is situated on Peckatonica River, at the junction of the Central Illinois Railroad, with the Chicago and Galena Railroad, and is one hundred and twenty-one miles W. N. W. of Chicago. It is bordered by prairies and groves on its different sides, and is well worthy of the handsome temple of justice which has just been erected there, and of which we give an illustration in the accompanying frontispiece, as designed and completed, by Mr. E. E. MYERS, Architect, of Springfield, Illinois.

This perspective gives a very complete idea of the structure as it is.

The plans, as presented in the succeeding plate, will convey the arrangement of the interior.

The first floor is divided up by two

halls crossing each other at right angles. Off of these are the various offices of County Clerk, Circuit Clerk, Deputy County Clerk, Deputy Circuit Clerk, Treasurers, Sheriff's and Supervisor's offices, the Probate Court, and two offices of Records.

All these are roomy well lighted and completely suited to their callings. The main hall which crosses the main part of the building, parallel with the front, contains the two principal stairs which lead to the circuit court room on the second floor, where also may be found the Law Library, the Petit Jury, and Witness rooms, as well as the District Attorney's office.

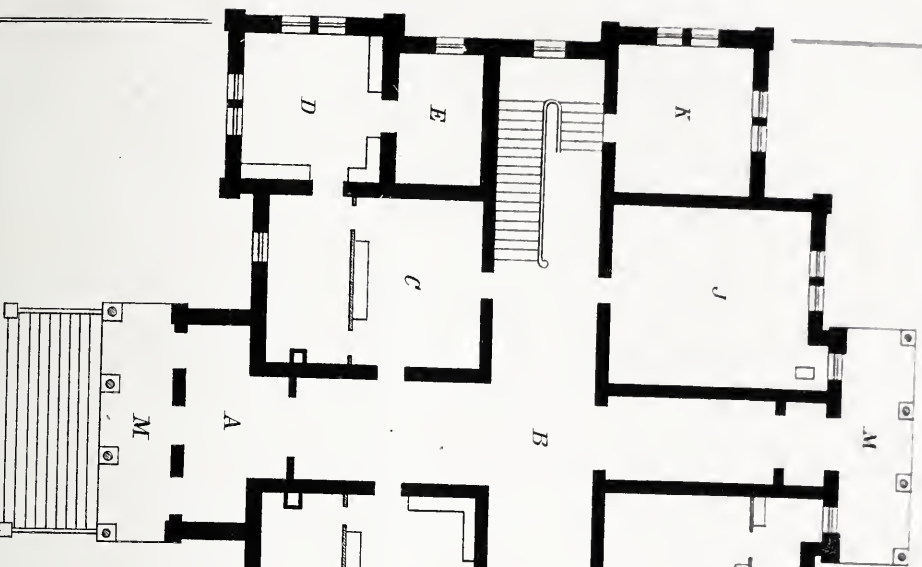
The Circuit Court Room is sixty-eight feet nine, by fifty-six feet six, very well lighted, ventilated and heated. A room, directly over the sheriff's office, with a private stairs from the latter, is set apart for lady-witnesses.

The Entre-sol, or floor occupying the half of the height of the circuit court room, is devoted to the grand jury room. Witness room, and the water-closets on the one flank; the other being apportioned to the petit jury rooms and water-closets. The basement is divided much in the manner of the principal floor; the county surveyor having his offices here.

The heating apparatus, with the boilers, fuel rooms, etc., are situated in the basement, and the arrangement is such as to secure the largest amount of heat with the least expenditure of fuel, the shape of the building being well adapted to that purpose.

Two cisterns of sufficient capacity are situated on either flank, as shown on the plan, which abundantly supply all the water necessary.

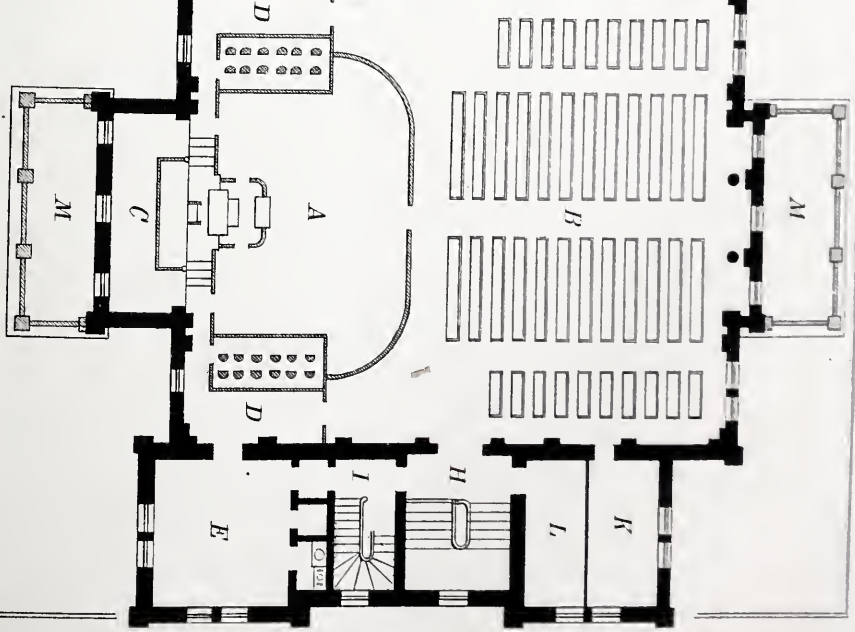
The building materials are of the best quality, and all the workmanship such as the builders may be proud of.



FIRST FLOOR PLAN.

COUNTY COURT HOUSE
FREEPORT N.Y.

E.E. Myers Archt.



SECOND FLOOR PLAN.

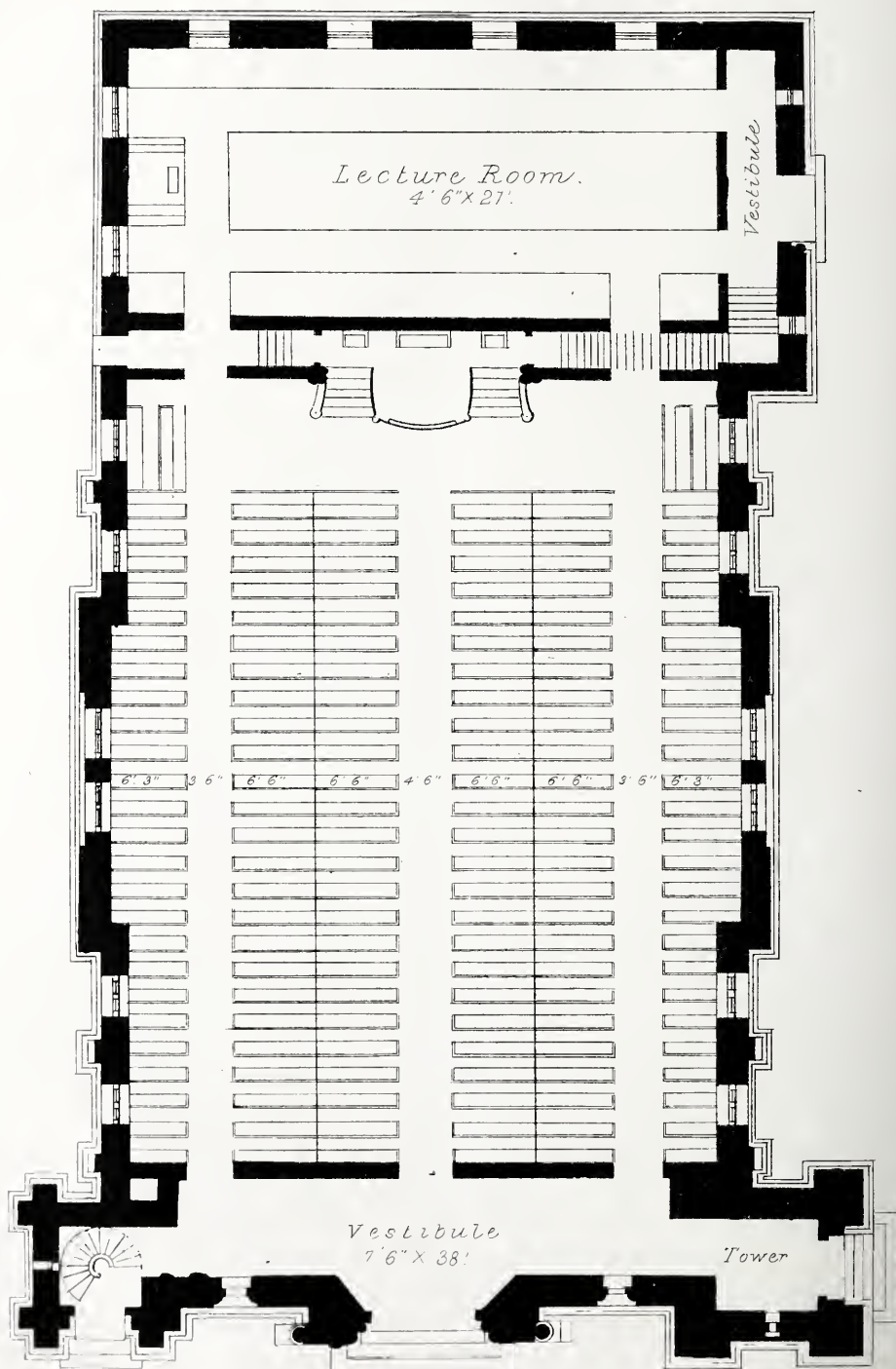




Ballou & Mendenhall del. & sculp.

BROWN MEMORIAL CHURCH, BALT^O MD





PLAN OF
BROWN MEMORIAL CHURCH.

HUTTON & MURDOCH, Architects
Baltimore, Md.

THE BROWN MEMORIAL CHURCH,

BALTIMORE, MARYLAND.

HUTTON & MURDOCH, ARCHITECTS.

THE illustration represents the Presbyterian Church, now in course of erection, on the corner of Park avenue and Townsend street, in the city of Baltimore.

The perspective sufficiently sets forth the general style of the building, to render any further description necessary.

The material for walls, is "White Maryland Marble," quarry faced, random ranged, except moldings, jambs, and ornamental work; all of which are tooth chiseled.

The roof is overlaid with slate, set in bands of cut patterns, and is surmounted with an iron cresting.

The interior is finished with a curved plaster ceiling, with molded enriched ribs and bosses. The section of ceiling at centres of piers, between windows, is nearly a full tre-foil, that portion of lower curve of tre-foil, between these points, is formed into a cross vault, intersecting the upper curve opposite the centre of each window.

All the interior fittings, pews, doors, jambs, wains-cotting, end gallery, etc., are of oiled walnut. The windows are being fitted with stained glass, in enriched, geometric designs, at the shop of Mr. Henry E. Sharpe, of New York.

The accompanying plan shows the general arrangement of parts. The Lecture-room building is two stories in height, having a Sunday-school room above.

The principal dimensions are as follows:

Audience-room, 80' by 57 $\frac{3}{4}$ ', by 47 $\frac{1}{2}$ ' high, exclusive of Vestibule.

Lecture-room, 26 $\frac{1}{2}$ ' by 57 $\frac{3}{4}$ ' by 18 $\frac{1}{2}$ ' high, exclusive of Vestibule.

School-room, 26 $\frac{1}{2}$ ' by 57 $\frac{3}{4}$ ' by 18 $\frac{1}{2}$ ' high.

Main Tower, 18' by 82' high; spirelet 41 $\frac{1}{2}$ ' high.

Smaller Tower, 15' by 63 $\frac{1}{4}$ ' high; spirelet, 22 $\frac{1}{2}$ ' high.

End Gallery, 14 $\frac{1}{4}$ ' by 46 $\frac{1}{2}$ '.

Front Vestibule, 10' by 46 $\frac{1}{2}$ '.

Number of pews, 154; accommodating about 800 persons.

The Church is to be heated by furnaces in the cellar, and is to be ventilated by openings in the ceiling, connected with louvres in the roof. The whole work is being executed at the expense of Mrs. Isabella Brown, in memory of her late husband, George Brown, Esq., formerly head of the house of Alexander Brown & Son, of Baltimore.

The plan of the church, as shown in the second plate, is commodious, well lighted and free from that drawback in ecclesiastical architecture, the gallery.

The Lecture-room at the rear is well lighted and every way convenient.

Throughout, this memorial church is pleasing in plan and exterior effect.

A NOVEL CEILING.—The ceiling of the new Opera House, in Paris, says a correspondent, will be composed of a vast number of plates of copper screwed one to the other in such a way as to be easily put together and taken to pieces again. Part of the advantages of the plan is said to be that the ceiling can thus be raised or lowered at will. The whole is divided into sections, which are painted with allegorical representations of the hours of day and night, more than a hundred figures being included in the whole. The place in which the artist carries on his labor is in the grand cupola over the pit, and forms an immense rotunda, 120 feet in diameter, and 65 feet in height.

LESSONS FOR LEARNERS.

THE DORIC ORDER.

WE have given the Tuscan order as an example in the preceding lesson, and now proceed to describe an order, much more used in architectural design than that, and therefore of more consequence.

Whatever may have been the origin of the Doric order, we must credit it to the Greeks, as they have named it after one of their own architects, Dorus, who is said by Vitruvius to have been, if not the inventor, at least the first to use it in a temple dedicated to Juno, in the city of Argos; and that from this example, the city of Achaia adopted it in their buildings. It is the first of the three Grecian orders, and the second in the four regular orders of the Romans. The simplicity of its ornamentation is sufficient to mark it as the first invented of the orders, and many remains in Egypt would give color to the supposition that its origin was of a far earlier date than that which the Greek architects claim for it.

The proportions of the Doric order generally are nearly the same as those of the Tuscan, with the exception of the diameter of the shaft being one-eighth of its height.

The first illustration here represents the FRONT, IMPOST and ARCHIVOLT, according to Vignola.

Fig. 1, is the face of the Pediment. Fig. 2, the profile of the same, and Fig. 3, a cross section through the centre of the Pediment.

We will now proceed to describe Vignola's method of determining the height of the Pediment.

Having determined the length of the superior fillet, draw a line at right angles with it through the centre of the Pediment, and taking J as a centre, and J, K, as a radius, describe the arc, K, G. Now continue the centre line G, J, up-

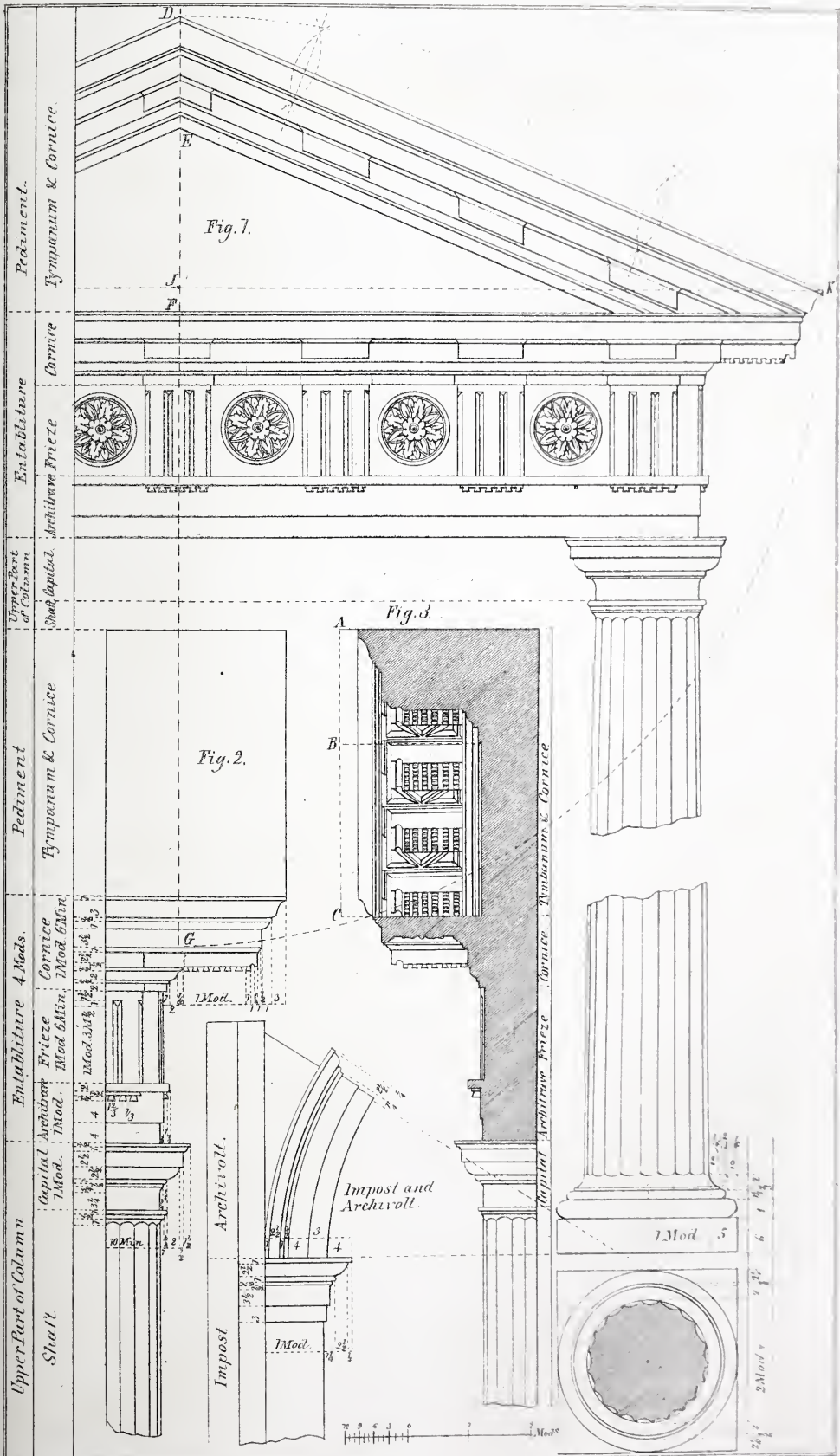
ward, and taking G as a centre and G, K, as a radius, describe the arc K, D; and where this latter cuts the centre line at D, determines the height of the Pediment, J, D. Draw a straight line joining the points, K and D, and the hypotenuse of the Pediment is found. Divide J, D, into five equal parts, and taking two of these, give them to the raking cornice of the Pediment, E, D, and mark off the same on the section of the Pediment, fig. 3, as shown at A, B. From B to C, on this section gives the actual height of the Tympanum, E, F, the horizontal line F, being determined on the profile, fig. 2, by the arc K, G, already described. The projection of the Pediment is supposed to be taken from the centres of the columns over which it stands, to the centre line, G, D, which gives the external thickness of the Pediment exclusive of the cap-molding.

The section is taken from the same dimensions, being drawn on a line with the profile for convenience.

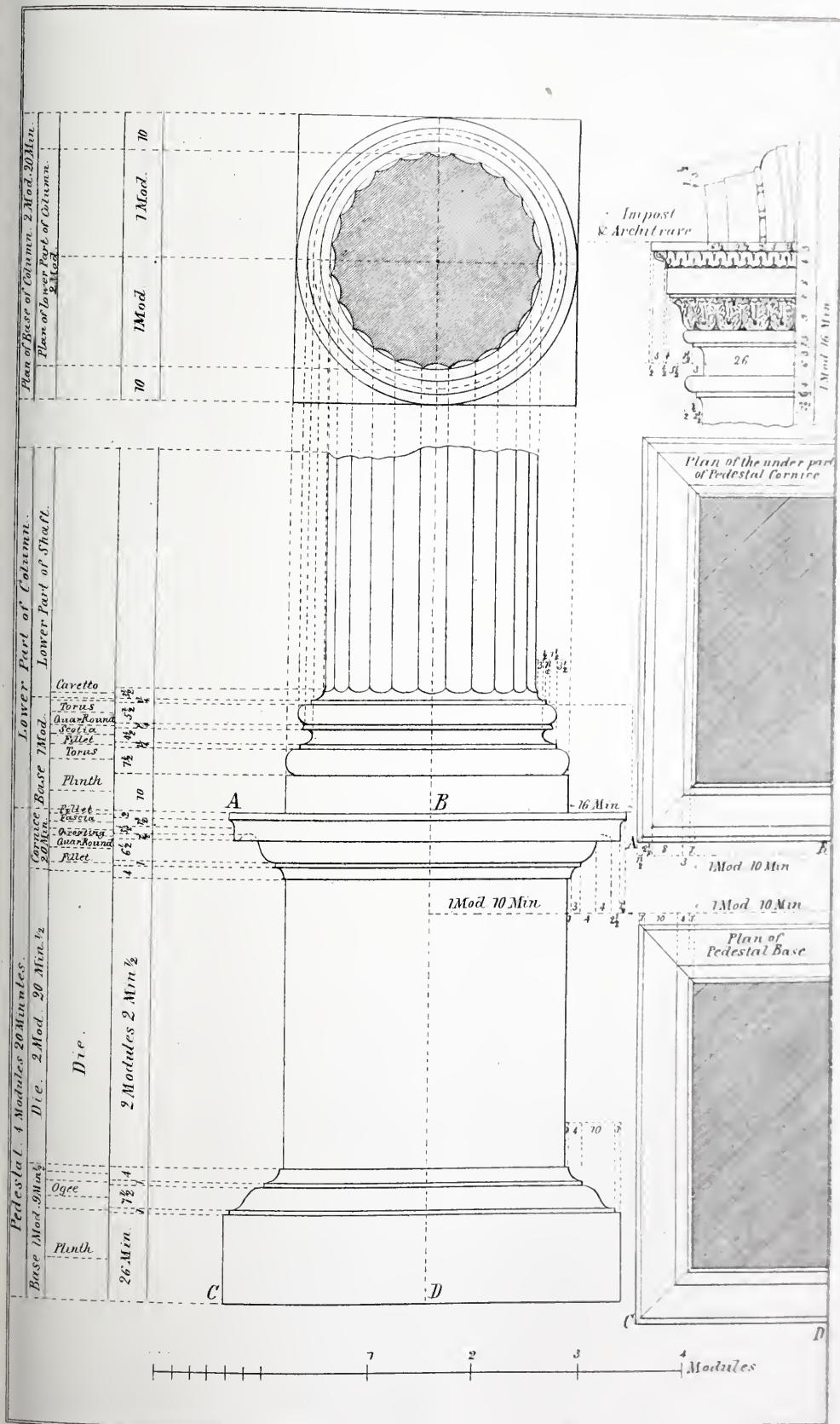
The face of the J, E, is on a level with the frieze, and that member is level with the exterior of the neck of the column. The top of the cornice C, (on the section) is invariably flat, and it is an egregious error to give it a slope as some ignorant builders have done, fortunately, in but a few instances.

The Archivolt, which is a composition of various members on the face of an arch connected with, or appertaining to the intrados resting on the imposts, is here shown. The section of the Archivolt is perpendicular to the curve of the intrados and the wall, and in figure, is very similar to the moldings wrought on the face of an architrave.

The intrados is the surface of a cylindrical or conical construction, such as an arch or a dome.



Doric Order according to Vignola.



The next plate shows the Pedestal and base of a column of the Doric Order, according to Palladio. The column is diminished at its upper end to fifty minutes; and, as shown in the example, is fluted without fillets. It is often placed in the Roman style, on a Pedestal, although in the Grecian style, it has no base or pedestal. The Pedestal consists of a plinth, die and cornice. According to Palladio the proportions of the pedestal are as follows: The plinth twenty-six minutes; the die, two modules and twenty minutes and a half, and the cornice twenty minutes.

The various moldings of the base are here shown, together with their relative proportions to each other. The mold-

ing of the cornice and base of the pedestal are likewise shown in the graceful treatment of Palladio.

Although the Grecian Doric Order is very bold and significant of graceful strength, yet in every day practice it is not so acceptable as that of the Roman style, and as the latter appears to be making itself more popular in modern architecture, we have chosen it as the most desirable for the special study of our learners; this being a day in which the useful is as much to be admired and practiced as the grand and graceful, especially when genius like that of Palladio and Vignola has been exercised upon it, and brought out its best features.

THE INSTITUTE OF AMERICAN ARCHITECTS.

WE are pleased to see that St. Louis has formed a Chapter under the above institute, having for its officers for the year just commenced: President, Thomas Walsh; Trustees, M. Randolph, John F. Mitchell, George I. Barnett; Secretary and Librarian, George D. Rand; Treasurer, R. Desbonne.

This is a proof of further progress in the onward march of our profession, and one which we feel proud of, as showing that the right spirit is at last aroused, and we trust it will not be allowed to rest here, but be at once taken up and followed throughout the whole country. Chicago is also in the field, and we have heard of others. All this is cheering to every lover of the profession, and cannot fail of ultimately securing the desired attention of the public.

The St. Louis Chapter has made arrangements for permanent quarters and we hope hereafter to report its proceedings, from time to time, as well as the transactions of other like associations now in existence.

It speaks well for the fraternal energy of St. Louis, that it should be thus early

in the field; and we augur much good to the profession generally from so commendable an example set by our active western brethren. It is a quiet rebuke to the tardiness of the Eastern States, and one which we trust will arouse a prompt effort on the part of our professionals here who have joined the Institute of American Architects, to warm up to their duty to the cause of progress and push on the column.

Every profession has its societies, where essays and conversations, thrown open to the public, influence a spirit of emulation among the members, and attract that attention which is so desirable. Is there among all those, one profession which needs more the like means of inquiry and instruction than that of Architecture? Not one. There should be a community of interest, and all the little selfishness and empty vanity which too frequently obstruct the advance of the profession should be pushed aside, and the way made clear for progress.

Once more we say we are pleased to see that St. Louis has formed a chapter, and we most heartily wish it well.



WATERING APPARATUS.

BOIS DE BOULOGNE.

WATERING APPARATUS.

THE mode of sprinkling applied to the grounds of the Bois de Boulogne, is here shown and may be at once understood. The water is drawn from the Seine, and instead of being carted in the clumsy way in which we are wont to perform that service to mother earth, is there delivered through percolated tubes on rollers, which are easily moved from place to place, and worked with the greatest facility in any form. There is also the advantage of their being capable of easy removal to any point, and being rolled over spots where no other appliance would be as applicable, and at the same time free from injurious consequences to the grass traversed.

This illustration, like all that preceded it, is taken from that admirable work now in course of publication, by M. Rothschild of Paris, entitled *LES PROMENADES DE PARIS, Bois de Boulogne et de Vincennes, Parcs-Squares-Boulevards*.

This work is one admirably adapted to convey to those who have not had the pleasure of visiting the gay French metropolis and its delightful surroundings, a fair idea of what bounteous Nature, and inventive man, have done for that Mecca of the pleasure seeker; and to give to all who have been visitors of that fairy ground a bright memorial of their observations.

But, who can say he knows Paris well enough? Those who have seen it, a very few years ago, can scarcely recognize certain localities to-day. It is ever changing and always new; bright now, but brighter anon. As fickle as are the fashion flies of its gay promenades, yet more fickle are the laws which govern its modes of building. In the gorgeous reign of Louis the Magnificent, Paris was the most resplendent capital in the whole world; its architecture then

was dazzling to the general observer, however objectionable it may have been to the critical. There was a solid grandeur beneath the glitter, that held the eye it attracted, and left an impression not easily effaced. What a difference there is now in the architecture of Paris. Yet the grandeur is no less remarkable, although the peculiarity of taste is widely at variance with that of the by-gone.

The change of the street effects, the substitution of fresh façades, set wide apart in the place of the picturesque mementoes of antiquity, are all remarkable beauties in the Paris of to-day. The surroundings are no less the subjects of charming reformation, and the boulevards and parks, the time honored *Bois de Boulogne*, and its neighboring *Long-champs*, have all undergone redressing and improvement, to keep pace with the newness of the rejuvenated capital.

The illustration of all these changes forms the splendid royal folios which Monsieur Rothschild has so liberally produced, and which all the crowned heads of Europe have patronized. To every man of taste it is a boon, and far more so in this transatlantic world of ours than in Europe, where the things it illustrates are within reach as it were.

Americans have a fraternal feeling for everything French, and are always forward to adopt every new style of architecture which, with that inventive power of design, our Gallie friends produce.

We are solicitous of the propagation of such works as this we speak of; and we trust that Mr. Rothschild will meet with the patronage here in the United States, which his most worthy undertaking has secured on the older continent; and it is satisfactory to know that such is likely to be the fact.

IRON STORE FRONTS.

THERE is one very desirable object to be attained by the use of iron as the material for architectural fronts of stores. We allude to the perfect admission of light. Where a whole building is devoted to business purposes, such as show-rooms, or working-rooms over the store, it is an immense advantage to get rid of the obstruction of piers of brick, or stone, which so tend to darken the different stories, and the weight of which, on the light fragile store-front on which they bear, is so unpleasing to the eye, as well as conducive of danger to the building.

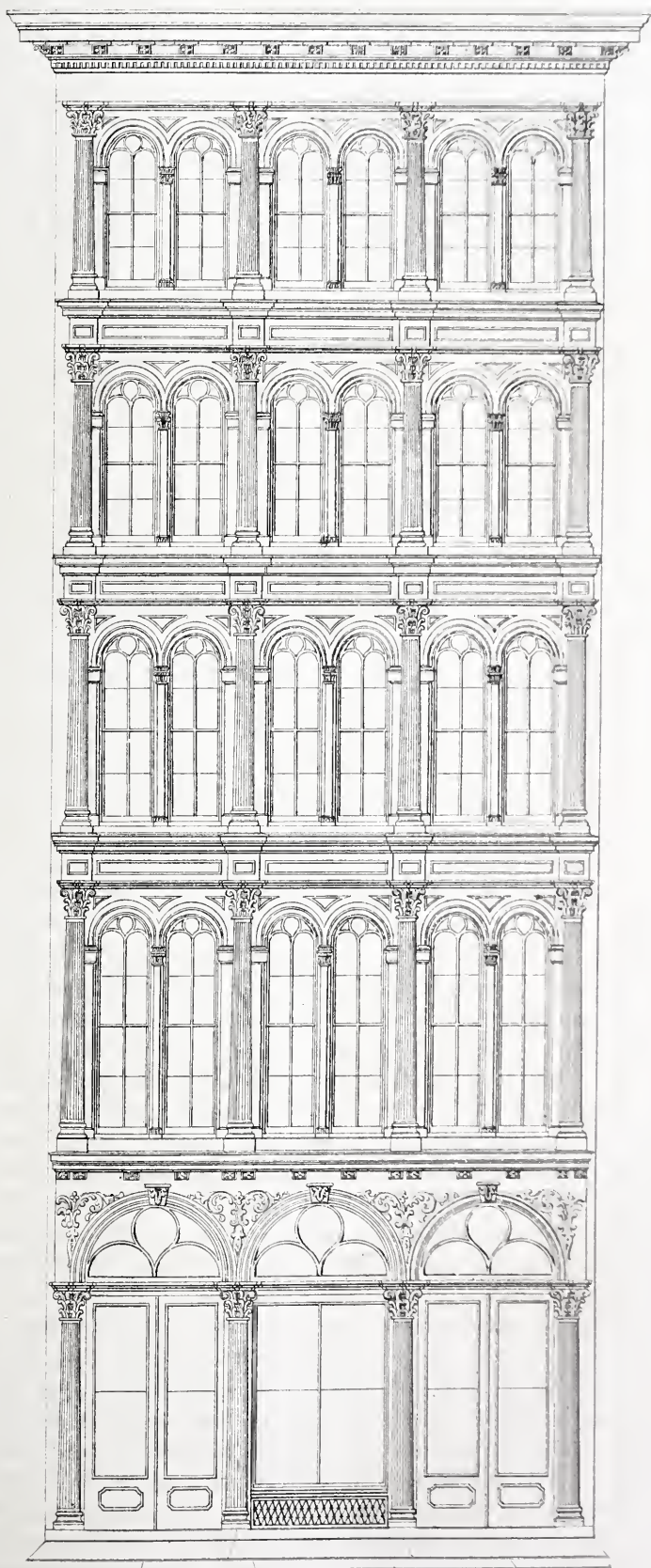
In the design here presented abundance of light, with most desirable lightness, are the points of excellence, and whatever may be said of the sameness of treatment of the different stories, the design is at least uniform and practically, if not artistically, good.

There is a serious objection to placing the same order on each story, one above the other, as the diminished height of each story disfigures the order by contrast. This is especially the case with regard to the Corinthian order, which is used in the design now under consideration. But, apart from any such technical objection, we consider this iron store front for the reason we have given, to be worthy of notice by men of business. It was presented to the REVIEW by ORAM & Co., of this city. The use of iron in architecture is spreading over the whole country, and very fine examples may be found in all the principal cities and towns of the West. In fact, the growth of this special material is something akin to the wonderful, seeing that its history is of such a comparatively recent origin. Yet recent as it is there are already rival claimants for the honor of its first introduction as a fronting for buildings.

Architectural iron works are now nu-

merous enough for the present wants of the building age, and all that is required seems to be a due attention to the rules of art, and the requisitions of true taste to make this great material the worthy vehicle of design.

It is not to be denied that hitherto an overweening effort to display the peculiar applicability of the metal to ornamentation has given rise to a system of over-decorating the compositions it has been applied to. In fact, that a flagrant display of tawdry combinations of floriated work, has intruded itself so far on the public observation, as to become hurtful in its effects as far as the interests of pure architecture are concerned. This weakness can be traced in great part to the fact, that in all, or at least most of those foundries devoted to such work, draughtsmen are employed to whom is confided the designing of such façades as the company contracts for; the person about to build, being informed that he can thus be saved the unnecessary expense of an Architect's fee. The draughtsman may be very good as such, and yet have but a very slight acquaintance with architecture; and this we deeply regret to be obliged to say, is too often the case with draughtsmen; especially those employed in iron works; they being more of engineering than of architectural draughtsmen, and but little conversant with the technical requirements of our art. As long as this is the case, so long will iron work, as applied to architecture, be liable to the gross errors it has already been the means of displaying, and so long must professional men deem it their duty to frown down such a usurper of right, and perpetrator of mischief. We are well aware that draughtsmen are needed in the establishments alluded to, but why not apply them to the getting out of working details of an Architect's designs?

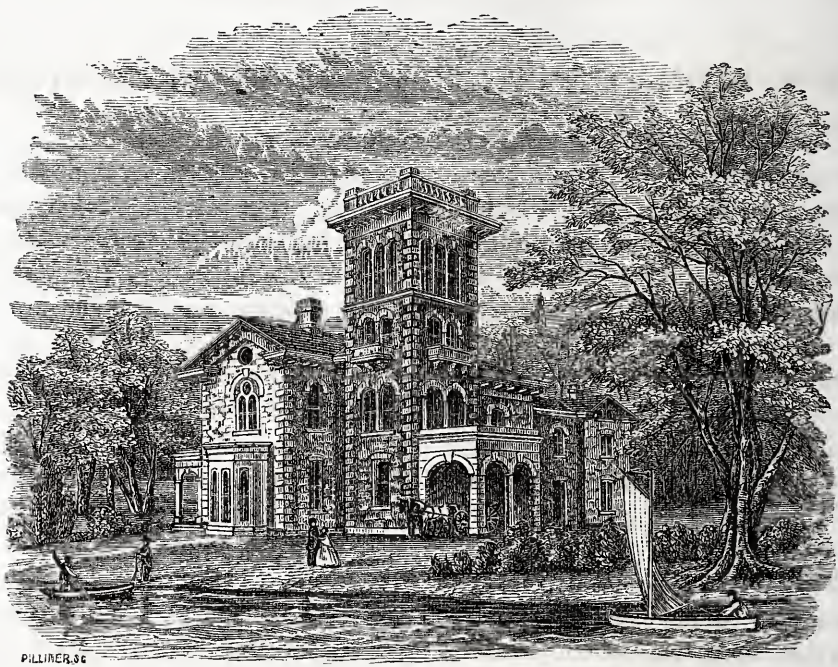


IRON STORE FRONT .

NEW YORK CENTRAL PARK BOULEVARDS.

THE magnificent Boulevard, one hundred and fifty feet wide, projected by the Central Park Commissioners, will run from the great circle at the junction of Eighth avenue and Fifty-ninth street to Tubby Hook, a distance of eight miles. Five miles of the track to 155th street, have been laid out, and will be completed by the close of next year. Two rows of trees will stand on each of the wide side-walks, and in time create a grateful shade; and two rows will stand in the centre of the road. The great width of the avenue will afford ample space for these. The plan has been adopted of locating the sewers, gas pipes, and water pipes, under the sidewalks. This will obviate the necessity of tearing up the street for a communication, upon the building of each new house. From Tubby Hook this boulevard will cross to Harlem river, under Fort George Hill, and run along its border to One Hundred and Fifty-fifth street. It will connect with the Sixth and Seventh avenues, at One hundred and Forty-fifth street. The Sixth and Seventh avenue boulevards are also under operation from the further end of the Park to Harlem river, and will also be ready for travel by the close of next year. The former will run from the Farmer's Gate, and the latter from the Warrior's Gate. Both are to be one hundred and fifty feet wide, but somewhat varied in plan. Four rows of trees will be planted on that of the Sixth avenue, but only three on that of the other. The Legislature has charged the Commissioners with laying out all the streets between One Hundred and Fifty-fifth street and Kingsbridge. From Houston street to One Hundred and Fifty-fifth street, the city has been laid out on the rectangular system of Philadelphia. The land being very bold and irregular at One Hundred and Fifty-fifth street, surveys ceased. Various movements

have been made within the past fifteen years to lay out this section, but without success. The Commissioners will not adopt the numerical rectangular system. They will cut through rocky hills at a great expense, or fill hollows, but wind their routes where openings may offer. The Park Commissioners have also laid out Mount Murray Square, covering twenty acres, between One Hundred and Twentieth and One Hundred and Twenty-fourth streets, near Fifth avenue. This tract has been enclosed and set out with trees. The cost thus far has been about \$15,000, which was all that the Legislature had appropriated. Among the improvements going on in the Park is the building of a new conservatory, near Conservatory Lake. Its length will be two hundred feet, and its width sixty feet,—the foundations have been laid; it will be filled with rare tropical trees and plants. The panels of the Terrace are being tiled in marble, and an observatory is in contemplation. Stone is being prepared for the new Belvidere at the southwest end of the old reservoir. During the coming year a fine museum will be built on the east side of the Park, between Seventy-ninth and Eighty-fifth streets; it will be divided into sections, for different departments of natural history, and for art galleries. The old Arsenal and other buildings now used for storing the donations that monthly arrive from all quarters of the world, have become crowded. The Commissioners hope that the new museum will be filled in this manner, and that the necessity may be saved of spending public money for any of them. Preparations are now making on Manhattan Square, between Eighth and Ninth avenues and Seventy-seventh and Eighty-first streets, for a great collection of animals and birds, and several bear pits have been dug. The ground covers twenty acres, but is considered inadequate.

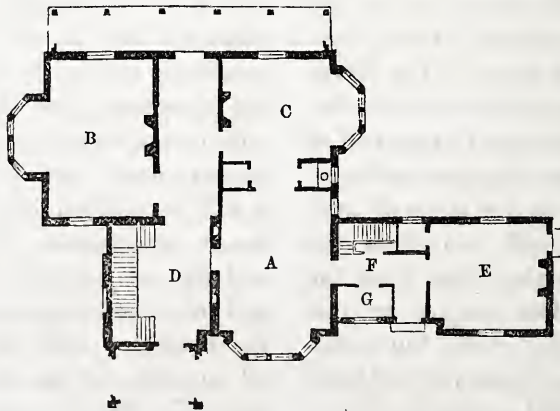


DESIGN FOR A SUBURBAN RESIDENCE.

THE illustration we here give is one of those suburban residences which we have so frequently referred to before. It is constructed with stone, hammer-dressed, and laid broken range. The

quoins and all the sills of doors, windows and arches, are each of granite, patent hammer-dressed.

The design is in Italian; broken in its outline, with campanile and *porte-cochere*.



PLAN OF FIRST STORY.

The principal entrance is through the tower, which also contains the main stairs. A wide hall extends through it to the opposite side of the house, and opens on a porch which stretches the whole length of the main building.

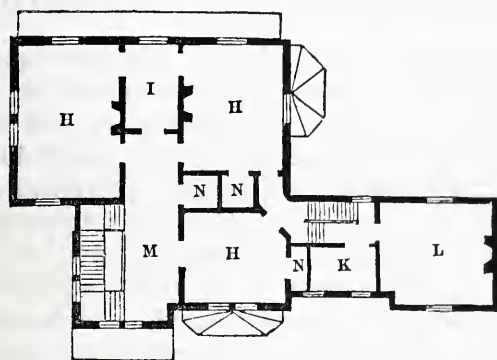
On the left of the hall is the Drawing-room B, 16×24 feet, with a large bay window on one side. On the opposite

side of the hall is the Dining-room A, 16×22 feet, with a bay window. Connected with this, by folding doors, is the Library C, 15 feet by 16, which also has a bay window. Between these rooms are China closet and wash-basin.

A wing extends back from the side of the Dining-room, which contains the Kitchen E, 16 feet by 17, having a Pan-

try and a passage leading to the Dining-room, F, in which is the private stairs on one side, and Butler's pantry, G, on the

opposite side, to all of which is a private entrance. This arrangement gives perfect privacy.



PLAN OF SECOND STORY.

The second story has three large chambers, H, H, H, in the main building, with a Dressing-room, I, at the end of the hall, M.

The Bath-room, K, is over the Butler's Pantry, and a Chamber, L, over the Kitchen.

N, N, N, are large Wardrobe closets.

The main stairs are continued up to the upper story of the Tower, having a small spiral flight leading to the roof, which latter is surrounded by a balustrade. Balconies also project from the windows of the Tower.

The interior is finished with all the modern improvements, in the very best manner. All the joinery is executed in hardwood, and left of its natural color throughout, being oiled and rubbed to a perfectly smooth surface.

The main stairs are of oak, finished in the antique style, with paneled wainscoting, capped, etc.

All the furniture of the doors and sashes, including the hinges of the former, are of bronze metal, and the window-glass of all the principal rooms are French plate; the remainder being crystal sheet. The sashes are all hung with balance weights. Those opening on the porch extend down to the floor and hoist up into the window head just high enough to give clear headway in passing

under. The floors are all laid with Southern pine, quartered and blind-nailed.

The closets are all fitted up with suitable shelving, etc.

The Bath-room is fitted up with a tub lined with copper tinned, and a water-closet of the most improved make, having a wash-basin, etc. The hot water is introduced into the wash-basin, the bathtub, and the Butler's pantry. The pipe for the latter is galvanized iron.

Gas is introduced into every room in the house, the pipes being judiciously concealed, but so arranged as to make them everywhere accessible, in the event of accident. The same arrangement is also made with the water-pipes.

All the flooring timbers are substantial, and straightened with lattice (or herring-bone) bridging, where the span is more than twelve feet; and wherever framing is required the trimmers are of double thickness.

The principal partitions that support the flooring timbers are all of brick, and are continued up to the roof.

All the principal rooms have the latest improved grates for burning wood, anthracite or bituminous coal, besides flues for hot air. Tasker's Hot Water Apparatus is placed in the cellar.

The roof is covered with the best roofing tin, well soldered and thoroughly painted on both sides.

THE HOSPITAL OF THE PROTESTANT EPISCOPAL CHURCH, IN PHILADELPHIA.

CHARITY, the brightest of the Christian virtues, has no nobler illustration here on earth, than that which alleviates so much of human suffering,—the *Hospital*. Attendance on the sick poor at their own homes, has the one overpowering drawback of a want of those means of comfort which are so desirable when sickness comes, and which cannot be easily procured at short notice. The well supplied and attended Hospital is the place where all is ready for any emergency, and where medical aid has a favorable field for its efforts to save life, or to alleviate suffering.

To the great honor of the Protestant Episcopal Church of the Diocese of Pennsylvania, the Hospital we this month present engravings of, is freely open alike to all men, without distinction. Nor are they compelled to seek the required relief within its walls—they will be attended and cared for at their own homes, if not as well, at least as promptly.

The history of this Hospital is simple, and perfectly characteristic of the power to do good which true religion gives. Early in the year 1852, the daughters of the late John Leamy, Esq., presented to the Protestant Episcopalians of Philadelphia, six acres of ground, with the Leamy homestead thereon, for the use of an Hospital. Fifty thousand dollars were soon after collected from other friends of this endowment enterprise, besides funds for general purposes.

The Leamy homestead was at once put in condition for the reception of patients, and was formally opened on Saturday, December 11, 1852. The mansion, however, being small, was soon embarrassingly inconvenient for a public hospital, although commodious for family purposes. This state of things soon prompted an appeal, which met with suc-

cess. One lady gave \$20,000 for the purpose of building a chapel. Another undertook to raise \$600 yearly for the support of a chaplain. This same lady afterwards provided a permanent fund for this purpose, by transferring to the Hospital a legacy of \$10,000.

A third bequeathed the Institution \$15,000; and ultimately \$100,000 justified the prompt erection of the building, and the 24th of May, 1860, the corner stone of the new edifice was laid by Bishop Potter, assisted by Bishop Bowman, in the presence of the whole diocese of Pennsylvania, as represented by her clergy and lay delegates, assembled for their Annual Convention, and an immense concourse of deeply interested spectators.

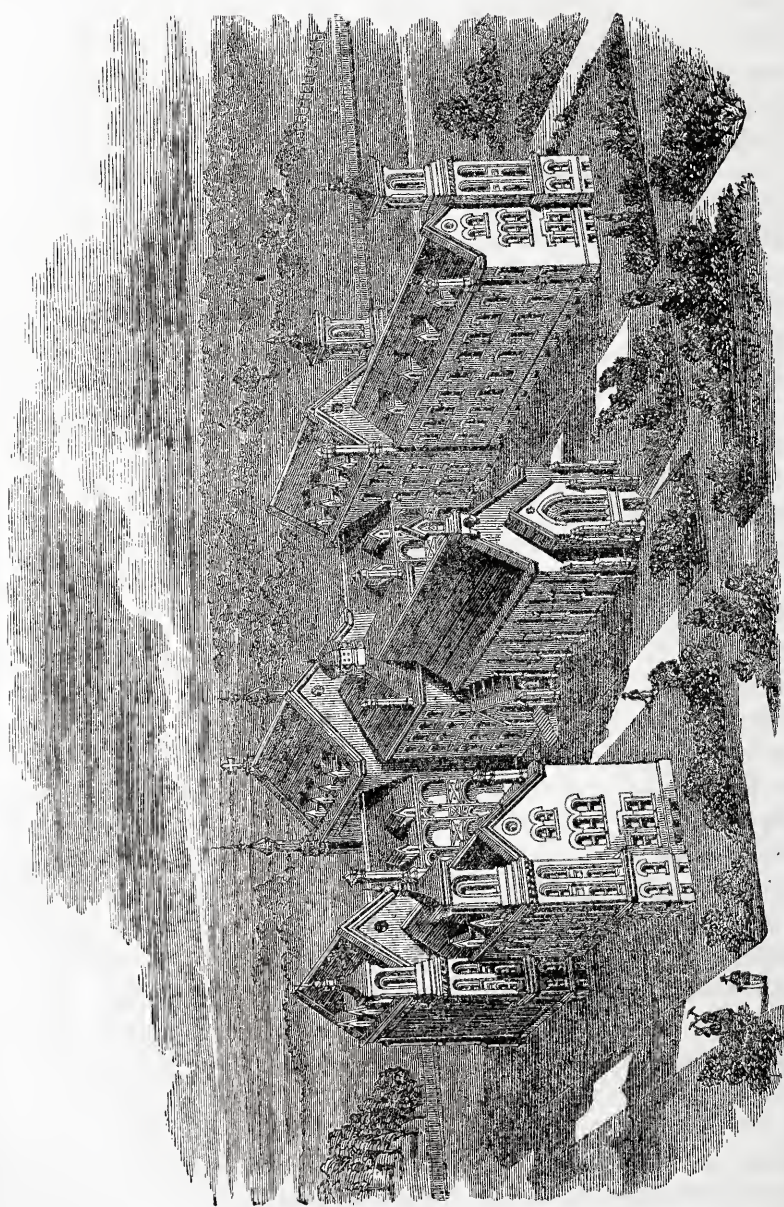
The work progressed satisfactorily during the remainder of the year 1860, the year 1861, and the beginning of the year 1862.

The funds in hand did not justify the managers in attempting to raise any more of the building than the Chapel, the centre building, and the west wing. During the war, Government, unable to provide fitting accommodations for wounded soldiers, called for the use of the Hospital. The work of finishing the building was urged on; and, as soon as floors were laid, additional wards, and even the corridors, parlors, and dining-rooms, were thrown open to the wounded, until over three hundred were accommodated.

The new building was thus used for nine months, until the Government provided hospitals of its own.

Soon after the original gift of land by Miss Leamy and Mrs. Stout, the Hospital acquired, by purchase, an additional square of ground on the east; and, recently, a lot on the north side of Lehigh avenue, immediately in front of the Hospital.





HOSPITAL OF THE PROTESTANT EPISCOPAL CHURCH, IN PHILADELPHIA.—BIRD'S EYE VIEW FROM REAR.
[Chapel in centre. Only centre building, chapel and left wing erected.] (7)

The site has an elevation of fifty feet above high-water mark. It is in the midst of a very large population of those most apt to need its help,—the working-classes and the poor. Large factories surround it on all sides, and eight railroads converge in its neighborhood.

The Hospital building is situated on the western part of the property, and fronts on Lehigh avenue, a street one hundred and twenty feet in width.

It is in the Norman style, modified to suit its purposes and character. It will now be described, for the sake of convenience, as though it were completed, though in fact the east wings has not yet been begun.

The Hospital consists of a centre building (from which the chapel stretches out to the south), with a long wing on each side, connected with the centre building by covered corridors. (See Bird's-Eye View of Hospital). These connecting corridors are fifteen feet wide, and run directly across the building, from its extreme east to its extreme west. On their southern side verandas are placed, so as to afford a pleasant promenade, in suitable weather, for convalescent patients.

Each wing consists of a front and a rear portion, the front portion being, in each wing, three stories high, and the rear portion two stories high, with an attic.

The Hospital is thus made up of three parallel pavilions; one in the centre building, and one in each wing.

The depth of the centre building, with the adjoining chapel, is two hundred and fifty-six feet. The depth of the wings is two hundred feet.

The whole front, including the centre building and the wings, with the connecting corridors, is two hundred and fifty-eight feet.

The centre building is three stories high, with a basement, open area, and cellar, the stories being fifteen feet high in the clear; each floor on a level with those of the wings.

The kitchen, and store-rooms of different kinds, occupy the basement. The first story above these is used in the front portion for administrative purposes and other requirements of the managers and officers.

The front part of the second story is occupied by the Hannah ward, containing ten beds. This ward is devoted to the care of women suffering from diseases of the heart and lungs, and was founded by Miss Grasby, its name being given to it in honor of her mother.

In the rear part of the second story of the centre building is the operating theatre, with patients' rooms.

The third story and attic are occupied by apartments for officers and servants.

On the rear, and adjoining the centre building, is the chapel. This seats about three hundred and fifty persons, and is accessible to the patients from all the wards. There are outside porches for the use of persons coming from the neighborhood.

The style of this chapel so far deviates from the Norman as to be properly termed Early English, merging into the Perpendicular, being an intentional variation from the general style of the edifice.

The front portions of each of the wings are principally intended for the domestic uses of the establishment. Here are pleasant dining-rooms, in which those who are well enough to walk, or wheel themselves in chairs, go to eat their meals away from scenes of sickness. Here, too, are cheerful libraries, where the patients read and otherwise amuse themselves; and where they meet on stated occasions in Bible-classes.

These portions of the building contain, as well, the special diet-kitchens, nurses' rooms, closets, lifts, and stairs. They also contain smaller wards, one on each floor. Two of these smaller wards are now used for sick children, and will be to the visitor one of the most interesting parts of the Hospital.

The rear portion of each wing consists of an elevated basement, two stories and an attic, these stories and attics being entirely occupied with wards for patients.

The basement of the finished wing is occupied by rooms for peculiar cases, for dispensary purposes, and for Sunday-schools, Bible-classes, and the other missionary agencies of the Hospital.

The capacity of the whole building may be set down as three hundred beds for all classes and descriptions of patients.

Towers, built for the purpose, and placed on the two external angles of each of the two wings, contain the wash-room, bath-rooms, water-closets, and slop-closets belonging to the long wards. These apartments are outside of the two ends of the wards, although adjoining them. Similar rooms are attached to the other wards.

A reservoir capable of containing about two thousand gallons of water is placed in each of the towers.

The warming and ventilation of the Institution have received the greatest attention, and provision has been made for them in the light of the most advanced science of the day.

Every effort has been made to secure cheerfulness in the building, and to avoid the obstruction or stagnation of air. All the rooms, closets, and passages, large and small, as well as the wards and corridors, are so arranged and connected as to be invariably well lighted and ventilated; so that not a dark or close hole or corner is found in the whole structure. For the same purpose, the wards and ward pavilions, the operating-room, and the chapel, have all been so placed as to be exposed to the greatest amount of sunshine throughout the day, and to the free play of prevalent summer winds. It is believed that the edifice combines the largest number of advantages with the fewest disadvantages in its practical adaptation to the great end in view, of providing the

greatest amount of health-restoring influences and the greatest facility of administration.

All the exterior walls are rubble-work, of stone selected with reference to its architectural fitness and durability. The roofs are of slate, that of the chapel varied in form from that on the other portions of the building.

When the building is completed, according to the original plan, it will consist of three parallel pavilions, of which the centre constitutes the administrative departments, including the operating theatre, with private wards connected with the same.

The other pavilions are occupied by patients' wards, in two stories, thirty feet wide, by one hundred and ten feet long, and fifteen feet high, all in the clear. These will comfortably accommodate thirty beds each, having sixteen hundred and fifty cubic feet of air to each bed.

These wards are open on both sides, and on one end. One third of the longitudinal walling of each ward, is devoted to the windows, and two-thirds to piers—say, four feet for the width of the windows, and eight feet for the wall surface between. There are two beds to each pier, with two feet space, and windows of four feet space alternately; thus giving to each patient a window at the side of his bed.

There are no pillars or supports obstructing the light, air, or view in the wards, as the flooring and ceiling joists span the full width of the pavilion, for which purpose they are made fifteen inches deep, and are strengthened or stiffened with lattice or herring-bone bridging, in two courses, through each tier, and the whole firmly bound together by means of iron tension rods.

The joisting is furred on the under side for ceiling, with lathing placed diagonally, and well secured with stout nails. Upon this furring the ceiling laths are secured in the ordinary way. This precautionary method gives very



great strength to the flooring, and most completely prevents any vibration whatsoever.

There are likewise wards within the attics, of like dimensions to those already given, which will accommodate twenty patients each, and giving the same allowance of sixteen hundred and fifty cubic feet of air to each bed.

In front of the principal wards, and adjoining them, is the nurses-room, with a sliding window in the wall, from which every bed can be seen. The small diet-kitchen is connected with this.

The wards are thoroughly lighted and ventilated, and the beds so arranged as to be most easily accessible, as well as being perfectly free from the cold air current, which usually circulates next to the walls. To secure this latter indemnity, the following plan has been adopted: Each bed is kept out twelve inches from the wall, by means of a wash-board, or plinth, placed at an inclination, amounting to that distance at the base, and this again is raised on a perpendicular plinth, so that by no possibility can the bedstead be pushed any nearer to the wall.

There are fire-places in the four corners of each ward, that discharge into the circular flues, two feet six inches in diameter, which are carried up the angles in small turrets, and serve as the principal ventiducts into which all the foetid atmosphere of the wards passes, and is carried off most effectually.

In the principal towers are located the water-closets and wash-basins, and a circular private stairs gives access to each ward.

The ventilating flues, just spoken of, are regularly plastered smooth on the inside, in an accurate manner by a plasterer; thus affording no obstacle to the free emission of the smoke, and ensuring perfect draught and thorough ventilation.

It remains only to state, for description, that there is an independent one-story building, of eighty feet square, in which

are the laundry and drying rooms, a room for post-mortem examinations, rooms for the reception of the friends of deceased persons on funeral occasions, and a room for the gate-keeper. This building also contains the boilers which supply the steam for cooking and for heating the entire establishment, a machine-shop, and extensive room for the storage of coal.

This building is connected with the main building by a well-lighted subterranean passage-way, through which entrance may be had to the Hospital for all its operations.

The outline of the building was suggested by the Parisian *Hôpital Lariboisière*, of European celebrity, in which the advantages of the parallel pavilions have been clearly demonstrated.

The system, followed is one that gives unlimited extent to such a building, and the original design was laid out for an additional pavilion on each flank, similar to those here shown.

Judging from the applications now made, and which are constantly increasing, a very few years will see the extreme pavilions also built, and then the Hospital of the Protestant Episcopal Church in Philadelphia, will be the most extensive building of that class, on this Continent, and fully equal to any in Europe.

The work which the Hospital has done in caring for the sick and injured will be appreciated when it is known that during the years in which its operations were carried on in the Leamy Mansion, three thousand and fifty-two patients were cared for in the wards, and twenty-four thousand five hundred and forty-nine in the dispensary, and that since the new building has been occupied, three thousand five hundred and thirty-eight patients have been treated in the wards, and thirty thousand and fifteen in the dispensary.

Of the patients treated in the wards, four thousand four hundred and thirteen were discharged cured, fifteen hundred and thirty-two were discharged im-

proved, and five hundred and sixty-five died.

The total number under care in the wards since the opening of the Hospital has been six thousand five hundred and ninety.

There were under treatment, in addition to the civil patients, from July 30, 1862, to March 18, 1867, seven hundred and five sick and wounded soldiers; thirty-three were removed by death; the remaining portion were either returned for duty, or otherwise discharged as no longer fitted for duty in the army of the United States.

The idea with which the Hospital was started, was, that though a denominational Hospital, it should *open its doors to all, without regard to creed, color, or country.*

The records show that the patients have been both whites and blacks, Protestants and Romanists, Americans, Irish, English, and, indeed, of almost every nation under heaven.

Under these circumstances, is it unreasonable if the Board of Managers appeal for aid not only to members of the Episcopal Church, but as universally as it confers its benefits?

During the year 1854, between two and three hundred patients were treated in its wards; but there was no dispensary.

In the year 1867, over *nine hundred* patients were nursed in its wards, and over *six thousand* patients prescribed for in the dispensary.

But the demand has—alas!—always been far in excess of the ability of the Institution to meet it.

In the Report for the year 1855, the Managers speak of “the repeated applications for admission when the number was completely filled up, and which it was necessary to reject.”

In 1856, they say, “The fact that the Hospital is at all times full, and that many apply for admission who cannot be received for lack of room, is an emphatic token that new and more extended buildings are required.”

In 1857, they report that the wards were frequently overcrowded, and that even this overcrowding was so far from meeting the demand for places, that for some time five applicants were said to have been rejected for every one admitted.

The excess of the demand over the ability of the Institution still continues; and it could this moment do twice the amount of good which it is doing, did the capacity of the buildings, and the money placed in the hands of the Managers, permit the Institution to open its doors to all the worthy and suitable cases that apply.

The unfinished state of the building, which strikes the eye so forcibly on a comparison of the Hospital as it is with the Hospital as it would be if completed, and which seems to proclaim, “These men began to build, and were not able to finish;” the great inconveniences which arise from the present contracted size of the Hospital, and which make it necessary to have the male and female patients in the same wing,—a very serious evil, confining, as it does, the women to the uppermost parts of the building, and interfering with their free access to the grounds; and, above all, the sad necessity which the Institution now labors under, of turning worthy and suitable applicants for refuge from its doors; constitute an appeal to the humane and liberal-minded to which words can add no power, and imperatively demand that the eastern wing shall be erected at the earliest possible date.

Such an institution is an honor to our city and to the Church.

If they did well who began it, they will do well who shall help to continue it.

Each noble gift it has received, each earnest effort made in its behalf, calls upon those who can feel for the suffering, who can admire a beneficent act, who realize that they will be called upon to give an account of their stewardship, to go and do likewise.

EASTERN WING.

WESTERN WING.

CENTRE BUILDING.

- 1 Library and Managers Room, 28' 6" X 21'
- 2 Steward's Room, 19' 6" X 23'
- 3 Apothecary's Room, 19' 6" X 21'
- 4 Hall, 17' wide
- 5 Steward's Room, 15' wide
- 6 6 Closets
- 7 7 Bath Rooms
- 8 8 Chambers, 15' X 20' 6"
- 9 Officers Dining Room, 15' X 20'
- 10 Chaplain's Room, 15' X 20' 6"
- 11 11 Porches
- 12 Vestibule
- 13 Chapel, 108' long
- 14 Staircase
- 15 Office
- 16 Chancel

WINGS.

- 1 Ward Library, 14' X 20'
- 2 Dining Room, 14' X 20'
- 3 3 Closets
- 4 Private Ward, 6 beds, 14' X 20'
- 5 5 Lin.
- 6 Ward Kitchen, 14' X 15'
- 7 Nurses' Room, 14' X 15'
- 8 Bath Room and Water Closets
- 9 Passage, Bath and Water Closets
- 10 Ward for 30 Beds, 20' X 110'
- 11 Passage, Bath and Water Closets
- 12 Verandah



COMMUNICATIONS.

ARCHITECTURE AND OUR PUBLIC BUILDINGS.

POETRY is a sublime and measured expression of the author's conception of grandeur and beauty. Painting and sculpture are imitations of Nature, music the harmony of sounds; but, architecture is the first and grandest of all arts, and is the invention of man, without any guide to govern him in his conceptions of proportions, strength and beauty. Hence it is the most difficult, and least regulated of all the fine arts.

Its history is coeval with civilization, and its monuments have perpetuated the deeds of the great, when all other records have been swept into oblivion by the hand of time.

Architecture consists of two parts, first; the essential, and secondly, the ornamental. The former regards the real quality of building, their conveniences, strength and durability; the latter their beauty and symmetrical effect.

The history of architecture, like that of most arts, is involved in obscurity. Man's earliest ideas of self-dependence, no doubt, prompted him to seek shelter and protection, alike from heat and cold, which no doubt he found in caverns of the earth, and in the shade of a tropical forest. In this climate he first existed.

As the race increased, migration followed, and tents were used, and as they journeyed northward a more comfortable abode was required, when the conical hut was introduced. Thus from primitive huts, civil architecture has from various causes and influences advanced

progressively to its present state of improvement.

Architecture, from its nature, is a *progressive* science; taking a retrospect, it is not only instructive, but encouraging, compelling us to respect the innate strength and manifest destiny of an art, which, through innumerable difficulties, could steadily advance to its present position, where it claims to be the grandest, and one of the most useful of the sciences.

The first building of which we have any account, is the Tower of Babel, said to have been built on the plains of Sinai about 2247, B. C. In this building burnt brick and lime were used. As to its form and size we have no account.

The earliest specimens of the art are excavations in rocks, forming caverns. They were without doubt intended for religious worship. The finest specimens of subterranean architecture are found among the Hindoos; here we have the square columns without diminution capital or base. Then there are those of a later date having bases, shaft and capital ornamented, there capitals being trenchen-shape, and there shafts round, swelled and reeded, and ornamented with waterleaves.

The next styles which arose were the Persian, Indian and Egyptian. They all bear a resemblance in general character, but differ in detail. In each country we find temples and catacombs, hewn out of the solid rocks, and the walls adorned with hieroglyphics. At a later

date Manetho informs us, that the Shepherd Kings were overpowered by the Pharaohs, who built those temples and Pyramids, whose magnificent remains are the wonder and delight of the traveller on the Nile in the nineteenth century.

The character of the Egyptian buildings are solidity of construction. Their temples were generally without roofs, consequently the colonade had no pediment, supporting merely an entablature composed of an architrave, frieze and cornice. They were ornamented with hieroglyphics, zodiacal signs, and religious processions, some of these columns represent the trunks of trees, some bundles of reeds bound together at different distances, and ornamented at their bases with palm leaves. The capitals were composed of all the leaves peculiar to that country.

The next system appears to be the Mexican, found on this continent; the origin of which is as obscure as the worship of the sun. No doubt Mexican architecture dates back as far as the Egyptian, as the pyramidal form was used by them. In some of their pyramids the facings are adorned with hieroglyphics, in which are discernable serpents and crocodiles in relief. On one pyramid there are three hundred and seventy-eight square niches, symmetrically distributed, which have been conjectured to correspond to the Mexican calendar. These columns bear strong marks of the infancy of the art of architecture, they have neither base nor capital with a diminution. In the interior of some of their temples are paintings of weapons, trophies and sacrifices. There is no appearance of their ever having used windows. Thus we have the evidence of an ancient civilization on this continent, which may be anterior to what is termed the old. Their paintings and other ornaments are in some respects superior to those executed in the days of the Shepherd Kings.

The next system in Chronological rotation, is what is termed Classical or

Grecian. To this wonderful nation are attributed the three orders of architecture, which was brought to perfection by them, viz., the Doric, Ionic and Corinthian. Dorus, an ancient architect, is said to be the inventor of the Doric order, and built the temple of Juno at Argos, after this style. Among the many remains of the Doric columns, the proportions vary; the most ancient columns are shorter in proportion to their diameter than those of modern times. The shaft diminishes in thickness from the bottom to the necking; the capital is composed of an abacus, avols, and three amulets. The entablature consists of an architrave, frieze and cornice; the columns are generally six diameters in height, the same ratio that a mans foot bears to his height. The finest modern specimen of this style of architecture in this country, is the Patent Office at Washington; it occupies a whole square, having a portico on each side, containing eight massive columns, with corresponding pilasters.

The Ionic is the second of the Greek order, being invented by the Ionians as its name implies. Virtruvius gives an account, thus; that in erecting the temple of Diana, the proportions and dress of the goddess were studied, the diameter of the columns were made an eighth part of their height; the base with folds representing the shoe; the capital with volutes, in form of the curled hair worn upon the right and left, and the cymatium, for the locks pending on the forehead from the crown. The flutes in the column are supposed to represent the folds in the drapery, but more likely to rest their spears against. The finest modern building, built after this order on this continent, is the Treasury Building at Washington.

The Corinthian or third order of Grecian architecture is supposed to have originated in Corinth, but this is in doubt, as there are no specimens remaining in that city to confirm this statement, yet, its name would seem sufficient to entitle that ancient city to the honor of its

birth place. It may be of Egyptian origin, for there are many bell-formed capitals found among the Egyptian ruins; although the carving shows superior attainment, the delicacy of the foliage, the beauty and elegance of the caulicoles and volutes, with the symmetrical and easy disposition of the whole, are superior to anything yet discovered among the Egyptian ruins; and, even at the present day this capital exhibits the utmost elegance, beauty and richness that has ever been attained in architectural composition.

This order is divided into a plinth, column with base, architrave, frieze and cornice. The shaft of the column is generally fluted; the capital consists of an abacus, two rows of acanthus leaves, caulicoles and volutes. The cornice is ornamented with modillion blocks with leaves; below is an oval and slant molding, with dental blocks beneath them; the frieze is in relief, architrave doubled. Among the ruins of Balabee in Syria, are the remains of a temple which was built after this order of architecture in the most elaborate style.

Mr. Volney says: "the height of these superb ruins thus solitary and unaccompanied, at first strikes us with astonishment; but on a more attentive examination, we discover a series of foundations which mark an oblong square of two hundred and sixty-eight feet in length, and one hundred and forty-six feet wide." It presents a front of ten columns, with nineteen on each side, their shafts are twenty-one feet eight inches in circumference, and fifty-eight feet high, so that the total height, including the entablature, is seventy-two feet. Nothing can surpass the workmanship of these columns; they are joined without cement, yet there is not room for the blade of a knife between their interstices.

After so many ages they in general retain their original whiteness. When we consider the extraordinary magnificence of the temple, we cannot but be

astonished at the silence of the Greek and Roman writers on the subject.

An ancient writer tells us that at the rebuilding of the temple at Jerusalem, the Corinthian capitals were used on the pillars, that supported a cloister which stood near the west gate.

In our own country, the finest specimens of this beautiful order are the porticos connected with the Capitol at Washington. The porticos fronting the east have each twenty-two monolithic fluted columns, having central projections of ten feet four inches, forming double porticos in the centre, the width of the gable, the entire length of this grand building is seven hundred and fifty-one feet four inches, and the greatest depth including porticos and steps, is three hundred and twenty-four feet; the ground actually covered by the building, exclusive of the court-yard, is one hundred and fifty-three thousand one hundred and twelve square feet.

The Caryatic style or statue columns were used by the Greeks, as an emblem of servitude; a fine specimen may be seen at Athens.

Roman Architecture typifies Roman pride and ostentation. Here are triumphal arches with base reliefs, commemorative of the triumphs of kings and conquerors, and designed to perpetuate their fame, but subserving no loftier purpose; columns, to support only the memory of barbarous conquests, theatres, studios and basilicas, to make more magnificent the daily life of a presumptuous and tyrannical people.

There is an important distinction in the application of their columns; the Romans attached them to the walls. Another difference is also apparent, for besides the frequent employment of pilasters as substitutes for columns, the practice prevailed of super-columnation—of rising one order upon another, which was a matter of necessity in such enormous edifices as the Coliseum, a building which would contain eighty thousand persons.

A fine specimen of Roman architecture is the temple of Jupiter, also the Pantheon at Rome, which is still in use. Its spherical roof is its most striking feature, which was covered on the exterior with plates of gilded bronze. This building has been preserved from the ravages of time by different emperors, and contains the tomb of Raphael and other distinguished artists, who left large sums of money for its reparation. A writer says in speaking of the Pantheon.

"Let not the traveller complain if even in this magnificent monument, he shall find that his expectations far surpass the reality, and that fancy has thrown around the Pantheon an imaginative splendor; he must not expect to find in it the freshness of youth, years pass not in vain over man or his works; they may sometimes spare proportions and symmetry, but beauty and grace, whether in the marble portico, or the human form, soon yield to their touch and vanish. Twenty ages have rolled over the Pantheon, and if they have not crushed its dome in their passage, they have at least imprinted their traces in sullen grandeur on its walls; they have left to it all its primeval proportions, but they have gradually stripped it of its ornaments, its leaves of acanthus and its glossy colors."

Perhaps these marks of antiquity, and this venerable tint which time alone can shed over edifices, rather increase its majesty, by adding to its justly admired form, that which no architect can bestow—charm of recollection and the united interest of age and disaster.

The dome of St. Peters at Rome, St. Pauls at London, and the Capitol at Washington, are the finest specimens of modern architecture in this style.

Debased architecture was known as the Romanesque, including the Byzantine Lombardic, Saxon and Norman. Byzantine architecture prevailed in Greece in the early ages of christianity. The plan of a Byzantine church is in the form of a

Greek cross; that is having the arms of equal length, a double dome is placed over the intersection of these arms, the ends of which are covered with semi-domes, abutting against the main central cupola; porticos are omitted and semi-circular arches used.

The Lombardic succeeded the former and flourished in Italy under that government until the time of Charlemagne, (A. D. 774). There are two features which distinguished this from the former, viz., the bell tower and substitution of the Latin cross as a characteristic form.

Saxon architecture originated in England. Their churches had towers, which were used as strongholds; but few specimens remain of the Anglo-Saxon.

Norman architecture was the Lombardic transplanted into France, and there receiving modifications on account of a ruder climate. It differs from the Lombardic especially in the absence of the dome, and low pedimental roof; it is a combination of the four former styles. Remains of Norman architecture are found in abundance in Normandy. The religious edifices were built in the form of a Latin cross with semi-chancels, in the interior was a nave and two aisles, which were separated by arcades of Roman arches; underneath were frequently of crypt, externally the buildings were supported by small buttresses. The doorways windows and cornices were generally ornamented and deeply recessed. The ornaments were chiefly taken from the architecture of the different people whom they succeeded. Their towers were quadrangular and plain, and of little elevation. The roofs were generally vaulted with stone, the graining strong and plain. Norman architecture arrived to its greatest perfection about the middle of the twelfth century, The monks of that day studied both the theory and practice of architecture, in their own structures they worked as artificers and masons, the more intelligent superintending and directing the execution of plans, that were designed by

the Abbots and Superiors. Architecture has been the handmaid of religion in all ages, and the priests have been supporters and encouragers of the art.

Medieval architecture, known as the Gothic, was used from the twelfth to the sixteenth century, almost to the exclusion of the Norman. Hid in the mysterious darkness of a barbarous age, the propriety of the name has been a subject of dispute. Some have considered it to have been introduced into Italy, by the Goths, others imagine it to be a corrupt deviation from the Grecian and Roman.

This style is characterized by the pointed arch, by pillars which are extended so as to lose all traces of classical proportions, having no diminution. The openings become the principal part of the wall, and the other proportions become subordinate to these. All lines tend upwards, and each member is expressive of some mark of the christian faith. The plan of the church is cruciform. The substantial buttresses which gave strength to the walls, ran above the roof and finished with a pinnacle instead of the heathen dome. The christian spire points heavenward, of which faith whispers. Here, windowless walls are seen no more as in heathen temples, but the light from heaven pours in on the devout worshipper, illuminating his soul with thoughts fitting for "that building not made with hands, eternal in the heavens."

The various Gothic styles are as follows: Early English, Decorated or Perpendicular English, Flamboyant and Geometrical.

The first of these, called the style of the thirteenth century, is distinguished by long and narrow lancet headed windows, employed singly or collectively; in the latter case separated by piers. The heads are decorated with concentric tables or drip stones; the buttresses have a greater projection than the Norman, their columns are generally clustered; this style is noted for its unpretending simplicity.

The Decorated style was used in the fourteenth century. This style not only rivals the preceeding in chasteness, but surpasses it in richness. Its decorations are more tasteful and elegant, the walls are less massive, the doors less recessed, but larger and more highly finished. The pillars are more delicate and elevated, the windows are grouped together and separated by narrow piers, with one arch surmounting the whole and filled up with tracery; their gables and spires were enriched with crockets and terminated with an ornamental finial. These styles are English.

The Flamboyant style was used in France during the fifteenth century, and only differs from the former in its tracery which seems to wave like the wildest flame.

The Geometrical arose in Germany, being composed merely of geometrical lines from angular and circular elements, as may be seen in Strasburg Cathedral.

A writer in speaking of Gothic Cathedrals says: "These chronicles of stone, so elegant in detail, so imposing as a whole, so ingenious and full of meaning in their symbolism, express in language that cannot be mistaken, the deep and earnest religious feelings of those who constructed them."

The Renaissance style of architecture arose upon the decline of the Gothic in Italy; in this style the Classic and Gothic are united, combining the principles of both, using the latter in matter of detail. This style may be divided into four classes, viz., Florentine, Roman, Venetian and French. The Florentine excels in dignity, while the Roman excels in lightness and elegance. This was the Architecture of the seventeenth century.

Many prominent buildings are now being built in the French Renaissance style, on both continents. The new Capitol building, now being erected at Albany, N. Y., is in this style, and when finished, will be a credit to the State and Nation. The central tower will be three hundred feet high, crowned with an eagle, whose

altitude will be five hundred feet above tide-water.

Architecture in all ages has expressed the character of the people. It was by their temples and other edifices, they sought to impress an idea of their religious and political sentiments on future ages. In our own country Architecture becomes an important art, as by our edifices we are to express a higher civilization, of which the nineteenth century

boasts. Let us, then, invent a style of Architecture for our halls of justice, temples of truth, college and school buildings, worthy to be transmitted to remote ages, as in them the youth of our land are to be fitted to govern the destiny of this great Republic, whose political and religious freedom will eventually cover the whole earth.

B. S. D. F.

Clinton Iowa.

PHILADELPHIA FIFTY YEARS SINCE.

FIFTY years ago, the population of Philadelphia city and county was 108,116. At present it amounts to nearly a million. Then the built part of the city proper, was comprised between Vine and South streets, and the Delaware and Twelfth, or Broad streets, about one square mile in extent, with a few straggling houses here and there to the Schuylkill. Westward of Fifth, and north of Vine street, were open lots and farms, and, also, on the south side of the city. The front on the Delaware, scarcely extended three miles. The shape of the town was somewhat like the letter T, with the cross along the Delaware.

The buildings, public as well as private, were mostly of brick, a few having marble basements. Perhaps the only public buildings of marble were the old Center Square Water-works House (removed about 1822), and the Girard and Pennsylvania Banks, on Second and Third streets.

The small basin or tank, in the Center Square building, being the chief reservoir for supplying the city with water. There were, however, numerous deep wells in the streets and yards, furnished with old fashioned pump-trees, for lifting the water. Wooden cisterns, also, were sunk beneath the pavements for holding water having pumps, and supplied either from the roofs of houses or from the tank at Center Square. In times of fire,

the fire-engines received a considerable part of their water from these wells and cisterns, which were pumped into deep narrow fire buckets, made of leather, and passed along from hand to hand; hence the popular phrase, "pass on the water."

Fifty years ago, there were in Philadelphia, many large and elegant private mansions, which, (fashion, not having at that day seated herself in any one particular locality), were scattered over a wide area of city. Front street, although about that time, fast losing its attractive influences, was nevertheless, still the seat of a wealthy circle. From Race, down Front as far as Pine, and even below that street, were to be seen rows of large and elegant mansions. Above Arch there was a stately double house of brick, the residence of Henry Pratt, Esq. This was of the old style, which even at this period, if on Walnut street, for the excellent taste displayed in its architecture, would vie with many of the pretentious mansions located there.

On Third street above Spruce, was the residence of Wm. Bingham. This was the grandest and most aristocratic mansion in Philadelphia. It also was of brick, with marble quoins, and water-table; standing far back from the street, it was approached through a court-yard. Its interior, as well as exterior arrangement, with its spaciousness were equally

adapted for the grand and courtly entertainments which so frequently graced that mansion.

In Chestnut street above Fourth, on the site of the Custom House, stood, in those days, the old brick Norris house, which was purchased by the Bank of the United States, for \$101,000, through to Library street. Above Sixth, where Jayne's buildings now stand, was the Powel Mansion,—a lofty brick house, with an imposing doorway, and a double flight of high steps. The initials S. P., with the date (1796) on the heads of the the water conductors, were plainly legible from the pavement beneath. The Burd residence, at Ninth and Chestnut streets, old residents will remember as occupying the ground now covered by the stores of Howell, Caldwell and Orne. This mansion, though of brick, of the old Philadelphia style, in the width of its front elevation, with its wings and exterior gardens, formed one of the marked features of Chestnut street. The Schlater mansion above Twelfth street, afterwards the residence of Mr. Washington Sargent, was removed but a few years ago. This, like the Burd house, and most of those of the olden time, was not obtruded upon by the neighboring smaller mansions. This feature and its large doorway, and marble platform, with heavy iron lamp-stands, and the carriage gateway at the side, gave it a place among the first class houses of Philadelphia. On the north side, opposite this last, was the old Gothic mansion of Godfrey Hagy, a large yellow building, in the midst of extensive grounds, surrounded with trees, and in full view of the street. This, when built, was doubtless occupied as a country seat.

These are but a few of the many fine mansions of "Auld Lang Syne,"—mostly built of brick, they were quite comparable with, and perhaps more imposing and better adapted for grand and sumptuous entertainments, than the brown stone fronts of to-day. These last are for the most part, too tawdry, and

in there style of decoration, but little different from the store fronts of Market, Chestnut and Arch streets. Indeed, it may truly be said, that the same style of front and ornamentation, of stores and dwellings, are to be found in every city and village of the North, from the Atlantic to the Rocky Mountains; and from the Kennebee to Mason and Dixon's line.

To the eye of the stranger, the streets of Philadelphia are very narrow, although the lots are deep, the foot pavements are not wide enough, and the houses are jammed together. There are large double houses to be seen on Walnut and Chestnut streets, built seemingly without regard to cost, but on small lots out to the very line of the streets; in rows as it were, without conformity or uniformity, but only with contiguity.

The State House (or Independence Hall, as it has been called, since 1776), presented a different appearance fifty years ago, from that of to-day. The present wooden spire is a more modern construction, than the brick tower upon which it is placed. The old spire was removed, in consequence of the decay of the timber, and for some years, there was no State House steeple. That which now adorns Independence Hall, is a representation of the old structure. About fifty years ago, the city fathers, as they were called, having a native disgust for things ancient, by a vote, determined to modernize the interior of the Hall. Accordingly, with vandal hands, the panel and carved woodwork were removed, the walls plastered, and the interior modernized. Fortunately, however, for good taste, Mr. George Vaux was a member of council, and he, finding his protest against the proposed vandalism to be vain, preserved pieces of the various cornices, moldings, and panel-work for patterns; he hoping for a restoration. These patterns were for many years displayed in his office, on Arch street, and from them were copied the pieces of woodwork which now adorn

the interior of the old Hall, in which the Declaration of Independence was signed. Many suppose that this Hall is identically the same in its interior, as in 1776. But it is a copy and not the original. So, too, with Christ Church, on Second street. It has been completely modernized in the interior.

The Philadelphia churches, all of brick, were plainly built in conformity with the simple habits of the church-going people of that day. Except in the Catholic churches, paintings of saints and symbols were not permitted; not even in the Episcopal churches; and the Presbyterian, Methodist, Baptist, and Quaker meetinghouses, repudiated organs, choirs, steeples and bells. In those days, the old ladies went to meeting; at present they go "to church."

Paintings on the walls, or on the windows, were not then tolerated. The cross in or on the church, was regarded as a step to Papistry.

The first attempt at the Gothic, in Church Architecture, was St. Stephens, in Tenth street, which is an old Methodist meetinghouse altered into a church. The Gothic Architecture in the days of the Pilgrims, was regarded as a remnant of the work of the Goths, and the Franks, of Papistry. The vast piles of Gothic Architecture, the Cathedrals of England and the Continent, which are the wonders of Christendom, were built before the reformation, and before the invention of printing: prayer-books, hymn-books, and Bibles, were not in use among the worshippers of those days; light, therefore, in the interior was not required or desired. The congregations were unlettered, the clergy alone were readers and learned in religious matters; hence the interiors were dark, and the paintings were historical of the Christian church. Sacred history was impressed through the eye as well as the ear, by the instrumentality of those magnificent paintings, the works of great masters.

The characteristics of the grand inte-

riors were imposing and awe inspiring, to the highest degree. But, as the reformation progressed, images, paintings and symbols, were torn out and destroyed, or hidden away. Men went armed with their hymn-books and psalmody, and with texts at their tongues end.

After a time, the more modern church edifices, built in Protestant countries, were without architectural display,—paintings and allegorical illustrations were not tolerated in them. Whence now, comes this furor for the revival and restoration of Gothic Architecture of the middle ages? It has been said that the style of Architecture of a period, is illustrative of the social, moral and religious ideas and forms of that period. Is the explanation to be found in the luxury and expense of these times, or is it, that with the revival of its architecture, the way is gradually being cleared for the restoration of the Christian church?

VIATOR.

Montgomery County, Pa.

The questions of our valued contributor are such as we cannot give an opinion on. But, there is one view which we take from a professional stand-point, namely: that variations of taste in architectural design, find more ample illustration in ecclesiastical construction than in any other. This, it seems to us evident, arises from the natural desire of God's people to rear up to Him the most finished of their works. Such has ever been the case, and it may fairly be considered characteristic of man's very nature, that he offers up to the spiritual power, he either in his wisdom or his ignorance adores, the fullest offerings of his intellect. We see this exemplified in the darkest age of heathenism, as well as in the brightest era of the Christian world. Let us then refer the palpable fact of a growing desire for architectural display in our ecclesiastical edifices to this laudable desire to honor the GREAT ARCHITECT.

BRONZE.

THE aggregate amount of alloy used in converting copper into bronze, for statuary, and for architectural embellishments, is generally about nine parts of alloy to ninety-one parts of copper. The alloy consists of *tin* and *zinc*, and sometimes *lead*.

The statues made at Versailles, by the Brothers, Keller, celebrated founders of the time of Louis XIV., have been found, on chemical analysis, to consist of the following proportions:*

	No. 1.	No. 2.	No. 3.	Mean.
Copper	91.30	91.68	91.22	91.40
Tin	1.00	2.32	1.78	1.70
Zinc	6.09	4.93	5.57	5.53
Lead	1.61	1.07	1.43	1.37
	100.00	100.00	100.00	100.00

The bronze of which the statue on the Dome of the United States Capitol is made, consists of—

Copper.....	91.43
Tin.....	5.72
Zinc.....	2.85
	100.00

It will be observed that the aggregate of the alloy in the Dome statue, agrees very nearly with that of the statues at Versailles, but in the former the tin predominates, and there is no lead, while in the latter the zinc predominates, and a small portion of lead is added. Tin is the alloy that imparts hardness to bronze, and prepares it to resist the action of the atmosphere.

The bronze of bells, or "bell metal," consists of seventy-eight parts of copper and twenty-two parts of tin. Chinese gongs and cymbals are composed of the same amalgam, the only difference being that they are forged with the hammer. The ancients made their tools and war-like weapons of bronze,—their swords were composed of eighty-seven and one-half parts of copper, and twelve and

one-half parts of tin. The ordinary speculum metal of reflecting telescopes consists of *two* parts of copper, and *one* part of tin. This, of all the alloys, is the hardest, whitest, the most brilliant, and the most brittle. An alloy of ninety-one parts in one hundred of copper, and nine parts tin, is considered the strongest bronze that can be made.

The dark green color that bronze presents, after long exposure to the atmosphere, depends for the richness of its hue mainly on the proportions of the alloy, and is the result of oxidation.

Bronze castings, when they come from the hands of the fomder, are usually cleaned by the application of acids. When the parts are in large masses, this operation is a difficult one, inasmuch as it cannot be done effectually without complete submersion. In the case of the Dome statue, before alluded to, the entire weight of which is 14,985 pounds, every part was completely immersed in a bath of sulphuric acid, and suffered to remain so for twenty-four hours, after which it was taken out and thoroughly washed with pure water by means of a hose. A weak solution of nitric acid was then dashed over it, and on its becoming of a bright gold color, pure water was again freely applied, until all the acid was removed. It was then washed with acetic acid for the purpose of accelerating oxidation. This was done in August 1863, and it has now all the richness of an ancient bronze.

T. U. W.

Germanstown, Pa., Feb. 10, 1870.

Now, that bronze casting is becoming so much more prominent as an art, every item of information concerning it is desirable. This lucid and most interesting communication, with which we have been favored by our excellent friend and able contributor, is therefore most acceptable.—[Eps.]

*Dr. Ures Dictionary of Arts, etc.

ESSAYS ON LANDSCAPE GARDENING, NO. 3.

BY H. W. S. CLEVELAND.

ONE of the hardest and most constant trials of the landscape gardener, as of the architect,—(I mean of course a man of refined and cultivated taste in either profession),—arises from the necessity of adapting his works, in some degree, to the demands of his employers, who, of course, are very often utterly devoid of capacity to appreciate a really tasteful design. Probably this is especially true in our country, where men are continually acquiring fortunes who have never had any opportunity of esthetic culture. Of course there are not unfrequently, even among such men, those who possess by nature an innate love of the beautiful, and an appreciation of its development; which is all the more delightful when it makes its appearance unexpectedly, cropping out of a rude exterior. But nothing is more common than to find men whose ambition is to make a display of their wealth, who cannot in the least appreciate the beauty which results from simply bringing out the graceful or picturesque effects of which Nature may have furnished the keynote. They cannot be satisfied with anything which does not give evidence of lavish expenditure, even though it is in torturing Nature into all sorts of unnatural shapes, or obtruding artificial decoration where its presence is only an intrusion. In studying the characteristics of any given area, with a view to its arrangement, the same rules of relative adaptation should be observed as in the design of a landscape painting. First the general expression which it is desirable to secure should be determined on, and this is often easily decided by the presence or vicinity of natural features of such character as give tone to the whole scene. Where these features are grand and imposing, or present a scene of varied and striking beauty, it is simply a

piece of impertinence to derogate from them by the introduction of artificial decorations which serve only to detract attention from the charms whose power the artist should acknowledge by devoting his efforts solely to their most effective development, making his plantations so as to connect with, and carry out the prevailing expression, or to form a frame for some portion of the picture, possessing peculiar attractions to which the eye is thus directed, and the effect increased by the drapery of foliage which is thus secured. The drives or paths should be so arranged as to bring the visitor to the points where the most effective views are obtained, and no artificial structures should be admitted for the purpose of ornament, but only such as are obviously conducive to comfort and convenience, and then of the simplest form. Thus, a rustic seat may properly be placed in a position commanding a fine view, and the visitor will be glad to avail himself of the invitation it offers to rest, and study the scene before him at his ease, but an elaborately ornamented structure would divert his attention; and even though it might be of tasteful design, and able execution, it would be out of place. A bubbling spring with a cup hung beside it, might refresh him by its crystal purity and cooling freshness; but, a fancifully designed fountain would serve only to suggest a new train of sensations which, however agreeable in themselves, would not be in harmony with those excited by the grandeur or beauty of the surrounding scene. The general idea I am trying to convey is, that the development of natural beauty should be by means which are in harmony with it; and that their effect is only weakened, by diverting the mind from them to objects whose attractive interest is the result of merely human skill, however

intrinsically ingenious or interesting they may be. In this capacity of adaptation, it seems to me, lies one of the strongest tests of artistic power; and, of course, it requires a certain degree of artistic taste to appreciate it. But, multitudes of men have no other idea of landscape gardening than the mere contriving of quaint designs, and the introduction of artificial decorations. I have very often been asked to make designs for the arrangement of grounds I had never seen, and of which a plan was furnished me, showing the positions of the buildings, etc., and have heard much surprise expressed at my unwillingness to do it. The idea of taking note of anything beyond the immediate premises, seemed never to have entered the head of the proprietor; yet, a little reflection will show that the effect of the whole place, as seen when approaching it, and the effect of the views to be obtained of the grounds themselves, and their harmony with the surrounding natural scenery, as beheld from the house, or even from different windows, to say nothing of different parts of the estate, can only be determined by actual inspection. For the same reason, I can form but a very inadequate conception of the merits of a plan of grounds I have never seen, and have, therefore, always declined to furnish plans for publication; though it is very common to hear men pronounce a verdict upon such a plan, which can only be based upon a very partial conception of its merits or defects. In fact, landscape gardening with us consists for the most part in little more than convenience and economy of arrangement of small estates, with a more or less elaborate collection of natural and artificial decorations. We have got beyond straight lines and geometric figures; and, in occasional instances, have attained to illustrations of artistic skill, which, it is to be hoped, are doing good service in educating and elevating the popular tastes. What we now want is, the general comprehension of the fact that something more than

curved lines and irregular plantations are needed, to give expression and character; and that neither the bewitching attractiveness of a pleasant rural home, or the imposing dignity of a grand country residence, can be attained by making the place a museum of artificial ornaments. To acquire the power of appreciating a higher order of art, requires not only a certain degree of innate love of natural beauty, but an amount of careful study, which few men in this busy age can afford to devote to it. Even those who are inclined to the study, rarely examine any other works than those which are devoted directly to the art of laying out grounds, which for the most part comprise only the application of principles,—but do not go back to the principles themselves. If any one who is interested in the subject, and who has gone no further in his studies than the best known treatises, by professional landscape gardeners, will take up “*Sir Uvedale Price, on the Picturesque*,” “*Allison’s Essays on Taste*,” or “*Burke on the Sublime and Beautiful*,” he will be surprised and delighted with the new revelation which is opened to him of principles which bear much the same relation to the ordinary treatise on Landscape Gardening, that the governing principles of Architecture bear to a treatise on Carpenter’s work.

WESTERN ENTERPRISE.

CHEYENNE, the Capital of Wyoming, was visited with a very destructive fire on the 11th of January. One entire square, and three-fourths of another, in the central business portion of the town, were entirely destroyed.

Among the principal buildings burned were those occupied by the Daily Evening Leader, the American Express Co., Wells, Fargo & Co., and the Ford House. Total loss about \$300,000. Before the smoke of the smouldering ruins had vanished, twelve new buildings were erected upon the burnt district. All of these buildings were of frame construction. Negotiations are pending

which warrant us in saying that before the coming spring has passed away, several elegant brick blocks will rise Phoenix-like, out of the ashes.

There is an abundance of most excellent lime-stone throughout this territory, and within easy reach of Cheyenne. The best quality of sand exists in large quantities, and material for making good brick.

Brick making was only commenced here late last summer; but a half million of bricks were manufactured and put up in buildings.

At the present high rate of lumber here, frame buildings cost but a trifle less than brick ones of the same denominations.

S. H. W.

HOLLOW WALL CONSTRUCTION.

WE find that a patent has recently been granted in England, for what is deemed a novel mode of constructing hollow walls. This discovery consists of flat plates, or ties of slate, zinc, or wrought-iron, built vertically into the opposite joints of the parallel walls, every seventh joint being tied. These ties are made to match the height of one course, and are deeply notched to cut off the ingress of wet or moisture from the outside wall-section to the inner. They also have perforated ends, to allow the mortar to penetrate and bind them.

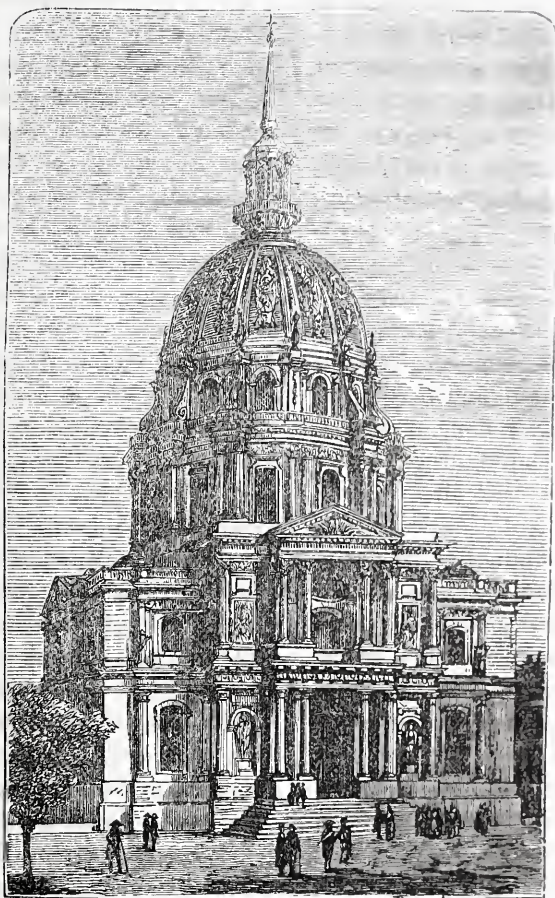
We have no faith in hollow walls as used in small buildings, where each section of the wall is but a half brick in thickness; for the simple reason that such construction must be very weak, even though bound or tied together at every fifth, or even at every fourth course in height. Nor can we see in construction of greater width of walling, any less tendency to actual weakening of the work by this system of *leaving out the core*, as it were. This remarkable invention or discovery of the English patentee, does not add much to the strength of the whole wall, or the tenacity of its parallel sections to each other; neither is there any charm in the "notch," to keep the wet away from the inner sectional wall, for although the passage is cut off, the drop or drip has to fall in the hollow space, and it is easy to conceive how the damp will thus be

admitted at the base of the wall, and have its full influence in creating and sustaining ruinous wall-damp.

Where walls can be constructed of a fitting thickness to render the interspace unobjectionable as far as strength is concerned, the hollow wall system is a good one, inasmuch as it ensures coolness and perfect dryness in summer. In such case, however, the thickness of the outer section is a brick and a half, and that of the inner section half a brick, the ties or binders being also of brick, and laid at every fourth course; observing to have a course of binders at the level wherever the joists come. These ties or binders may be two feet apart, horizontally, to make a sufficiently strong wall; and it would be well to avoid placing them over each other in their successive courses. As to the breadth of the interspace, it makes but a very little difference in the required effect, whether it be two or four inches. The convenience of binding is the point most to be attended to.

We have spoken before on this subject of hollow-wall construction, and would not now have reverted to it, but that we desired to question the advantage to the building public of this new patent, recently taken out in England, and which, as it found a place in the columns of our cotemporary, the *Scientific American*, might lead some one of its numerous readers to construct light walls in that way.

HOTEL DES INVALIDES.



IN the brilliancy of its architectural effects, Paris has long been pre-eminent among the cities of Europe, and, apart from its truly regal palaces, the stately pile which we present in the accompanying illustration, is one of the most attractive of its features.

It was built by Louis the XIV., from the designs of Bruant; the foundation being laid in 1671, and finished in 1679, eight years after. Henry the IV. was the originator of the grand idea of thus gratefully remembering the past services of wounded and worn veterans, by giving them a suitable retreat in their last days. England followed the good example in her Chelsea Hospital; and it is to be hoped that our country will yet raise such an asylum as will be worthy of our fame as a nation.

The famous dome of the Invalides is a chef d'œuvre, and is by Mansard, the architect of Versailles. The dome has three enpolas, one of which, painted by Lafosse, represents the glory of the Blessed, and is seventeen mètres in diameter. Its portico, in which the Ionic and Doric styles are harmoniously combined, is preceded by steps, and supports a triangular pediment. All the niches contain statues. The circular colonade contains an ornamented attic. Its enpola is covered with lead, gilded, and displays military trophies, which are also gilt. An elegant spire surmounts the dome; the extremity of it is one hundred and eight mètres above the soil. The principal part of the building, which is three stories high, is situated on a large esplanade containing rows of trees.

Arranged in front, on either side of the entrance, are guns of all sizes taken from the enemy. The entrance-gate is very fine. The principal court, which is surrounded with arcades, is one hundred and thirty mètres long by sixty four wide. There are two long wings at the sides, and at the bottom is the chapel, which is of a remarkable style of architecture.

In the Revolution it took the name of "Temple of Humanity," in order to be respected in a time of barbarism. Under Napoleon the number of its invalids greatly increased, and it received the strange name of "Temple of Mars," as if pagan times had returned. The Restoration gave it back its original name.

The hotel can contain five thousand men; it consists of four stories and three pavilions. The centre pavilion is decorated with pillars of the Ionic order, which support an arch bearing trophies. In it are figures of Louis XIV. on horseback, by Coustou, with Justice and Prudence near him. It was restored, in 1816, by Cartelier. Another pavilion is decorated with statues of Mars and Minerva, in bronze, sculptured by Coustou, and the two extreme pavilions with military trophies. Four statues four mètres high, by Desjardins, which formerly surrounded that of Louis XIV. on the Place des Victoires, and which represented vanquished nations, were removed to the Invalides, in 1800, in order to ornament the angles of the pavilions. The windows are ornamented with military trophies cut in stone. Each of them consists in a cuirass, in which is the window, and is surmounted by a helmet and cloak.

In the court which bears the name Cour de l'Amitié are similar ornaments.

The principal façade of the building is two hundred and four mètres long; it has three entrances: That in the centre leads to the Cour d'Honneur, which is one hundred mètres long by sixty-four wide; it is preceded by an elegant

vestibule, ornamented by Ionic columns. This court is surrounded by square buildings, the wings of which terminate at the angles by two small pavilions. Each edifice is decorated by arcades and by windows ornamented with military trophies. At each angle is a group of horses trampling on military weapons. The arcades form spacious galleries, the upper one of which, is ornamented with balustrades. The central projection of the southern one forms the portico of the church; in front is a statue of Napoleon. Four couples of Ionic columns support a like number of the Corinthian order, and above is a pediment in which is a clock supported by statues of Time and Study. Above this clock is a little belfry surmounted by a cross. The clock, which is by Lepaute, was put up in 1781.

The chapel, which was built by Mansard, is twenty-two mètres high and seventy long. The pillars of the arcades present in the *ensemble* a Corinthian façade supporting a handsome entablature, above which is a row of windows which cast a pleasing light on the numerous banners with which the two sides of the nave are ornamented. These banners were for the most part taken in the fields of battle in Africa.

Under the Empire, a great number of flags conquered from the enemy were displayed in the chapel. There were nine hundred and sixty at the end of the year 1813. On the day preceding the entrance of the armies of the allies into Paris, on the 31st of March, 1814, the Duke de Feltre, minister of war, caused them, by order of Joseph Bonaparte, to be burned, and he ordered the sword of Frederic the Great, which was preserved there, to be broken.

Several of the pillars of the nave bear inscriptions on marble. Among them will be remarked the name of Guibert, Governor of the Invalides, who died in 1786; of the Duke de Coigny, 1821; of Marshal Jourdan, 1838; Marshal Moncey, 1842; Marshal Lobau, 1838; and Marshall Oudinot, Duke de Reggio,

1847. Several illustrious names are engraved on two tablets in bronze: among them are those of Marshal Mortier, who was killed in 1835, by the infernal machine of Fieschi, and of General de Damrémont, who died under the walls of Constantine in 1837. None but governors who die whilst in office are allowed to be buried in this chapel, and to have their names inscribed there.

It is in the Chapel St. Jérôme that the body of Napoleon was deposited on being brought from St. Helena in 1840. It was buried on the 15th December, with a pomp unexampled in modern history. On a provisional sarcophagus were deposited the sword left by the

Emperor to General Bertrand, and the hat which he wore at Eylau, which hat he himself presented to Baron Gros.

The tomb of the Emperor, built in granite and porphyry without any ornament, occupies a crypt or subterranean chapel in the centre of the church beneath the dome. It is arrived at by a marble staircase behind the high altar. Above a gate in bronze, which gives access to the crypt, are the words of the Emperor: "I desire that my ashes may repose on the banks of the Seine, amidst the French people I have loved so well." Two large statues, representing Military and Naval Force, are placed near the entrance to the crypt.

THE NEW YORK POST OFFICE.

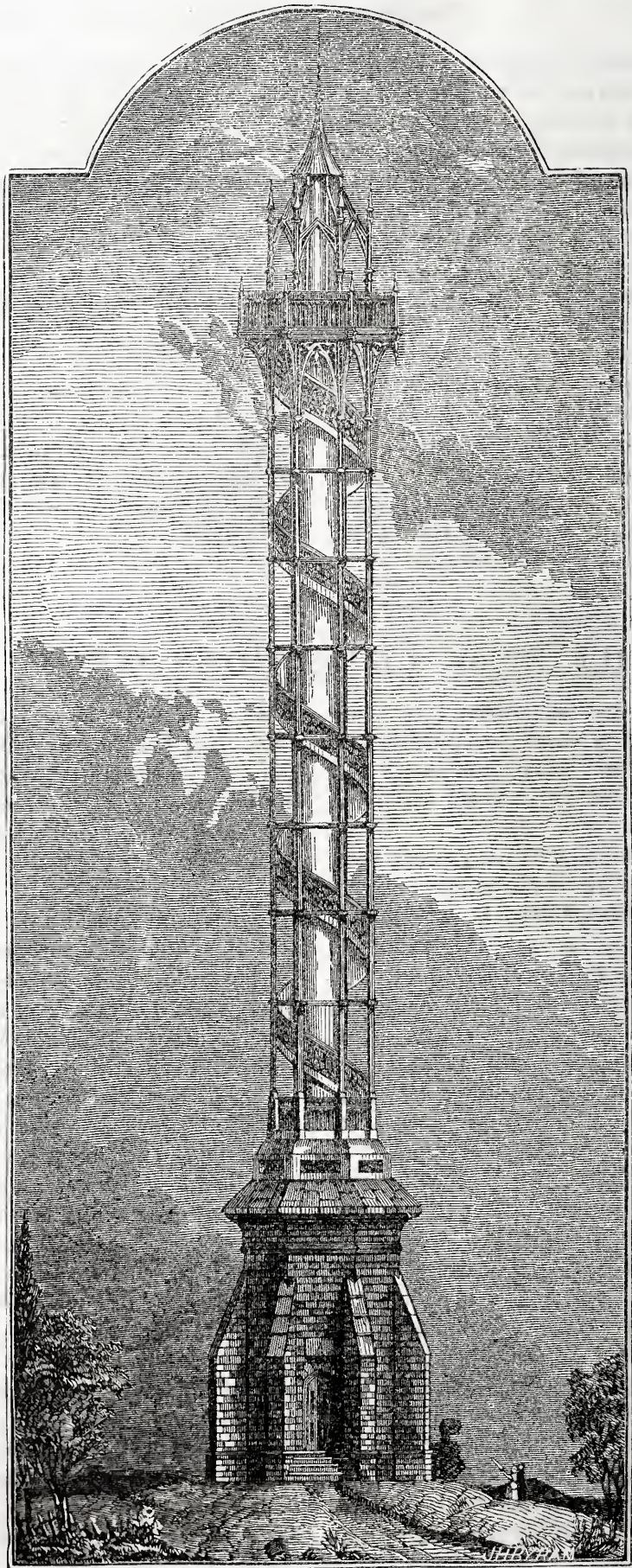
THIS costly new edifice now being erected is worthy of special notice as a style of construction which our National Government has not heretofore ventured on.

"The building has an extended front of 279 feet towards the Park, two equal lateral façades of $262\frac{1}{2}$ feet on Broadway and Park-row, and a front of 144 feet at the south-western extremity, facing the Battery, from which the central pavilion projects further toward the front. The main cornice is 80 feet above the sidewalk. The style of the building is Renaissance, the treatment of the roofs French. It will be three stories high in the walls, with a fourth story in the roof. The center of each façade is occupied by a broad projecting pavilion with a high massive roof, and the oblique angles at the corners are masked by smaller pavilions polygonal in plan, whose boldly detached roofs hide and mask the awkwardness of the angles. The walls will be of Maine granite, from the quarries at Dix Island near Rockland.

"The façade on the north or Park front is appropriated to the United States Courts. The central pavilion of this

front is 87 feet and six inches broad, containing five bays or intercolumniations, from the three middle ones of which projects a colonnade similar to that on Broadway, but carrying a pediment surmounted by a group of emblematical sculpture and lateral pedestals, crowned by eagles. The principal cornice of the attic story, enriched with Corinthian pilasters, rises to the height of the main roof, carrying a plain pediment and a grand Lucerne like those on Broadway and Park-row fronts. Behind this springs a dome 75 feet in diameter and reaching to 160 feet above the pavement. The dome is square in plan, but truncated in the angles, and rising to an octagonal deck, which is surrounded by a balustrade. Pedestals carrying the national arms buttress the ribs of the dome at the angles of the base, and four small circular windows are grouped around the central Lucerne.

"On the south-west front the whole space between the corner pavilions is thrown forward 21 feet into a central mass of the same breadth as that of the main pavilion on the Park front. The three middle bays of this are again ad-



vanced in an open two-storied portico of 16 detached columns, above which the third order is thrown back in a screen of eight columns, also detached, against the front. The front of the portico is brought forward in a balcony of four columns, and in the second story with a pediment which carries a group of allegorical figures, balanced in either side by pedestals supporting the national arms. The attic above the main cornice is ornamented by 12 Caryatides and a sculptured pediment. The dome, which surmounts the whole, is like that of the Park front, already described.

"The General Post Office occupies the whole of the ground floor, the inner walls throughout being carried in this

story on iron columns, so as to leave the area unbroken by partitions excepting for the boxes. The mails will be received and delivered to the wagons on the north-east front or part, an ornamental roof or awning of glass, and iron being thrown out for protection while being received or discharged. The public corridor occupies all the other fronts, having seven doors each on Broadway and Park-row, and three in the south front.

"The distinguishing feature in the arrangement of this Post Office, as of that in Boston, is the introduction of a *mezzanine* or half story above the public corridor; this *mezzanine* is made simply a gallery open to the interior of the Post Office room."

THE STAND PIPE, FAIRMOUNT.

THE visitor to our much admired Water-works, among the numerous attractive objects which surround him, is certain to have his eye caught by the slender, graceful pillar, enclosed by a surrounding stairs, which we illustrate on the adjoining page. It is the stand-pipe for the supply of water to the district west of the Schuylkill, which, having no reservoir is dependent on this being kept full, for a necessary supply of the generous beverage.

Two cornish butt-pumps keep it duly supplied with water; each having a steam cylinder thirty inches in diameter and eight feet stroke; plungers being seventeen and a half inches in diameter. Through this medium, water is delivered to a population of about forty thousand.

In the Summer of 1854, this fairy like structure was raised, under the superintendence of its designer, Mr. H. T. M. Birkenbine, C. E., then City Engineer, to whose taste and skill our citizens are much indebted for the many attractive works at Fairmount.

This stand pipe is situated on the high ground, about two thousand feet from the works, near Thirty-fifth and

Sycamore streets. Its base is one hundred feet above the level of the river. The central portion of it consists of a pipe of heavy boiler plate, five feet in diameter, and one hundred and thirty feet high. Around the lower part of the pipe is an octangular base of ashler work of gneiss rock, thirty-six feet high; each angle of this base is sustained by a buttress. On the top of the stone work there is a landing, enclosed by a railing, and from this landing a special stairs, winding around the stand-pipe, terminates in a platform, one hundred and fifteen feet above the base; a railing of Gothic scroll work protects the outside of the steps. Eight cluster columns, standing opposite each angle of the stone base, support the outside of the step; the upper platform is sustained by ornamental brackets, springing from the columns, which are continued above the platform where they are connected together, and to the stand-pipe, by flying buttresses; this platform is surrounded by a Gothic railing. The stand-pipe is surmounted by a spire and flag-staff. The whole structure is of iron except the base.

CO-OPERATION AT HOME AND ABROAD.

THE subject of co-operative societies is just now attracting universal attention, and as our community of builders is particularly interested, we give the subjoined extract from an essay in the *Commercial Chronicle*, showing that successful co-operation is practicable, and the best mode of equalizing living expenses with small earnings. It says:

The farmer, who is not receiving for his grain nearly as much as he received a year ago, cannot pay the same wages he could then pay; he must therefore, either stop cultivation, and the laboring man be deprived of employment, or his wheat must cost him less. Among tradesmen, too the diminished profits are compelling them to reduce expenses. The same principle must also assert itself with skilled labor. Manufacturers cannot always work at a loss. The formation of trade unions and "protective" associations among the mechanics and artisans in nearly all our principal branches of manufacture may make this downward movement in that direction less natural. The tendency will be, as it now is, to employ the power acquired through these organizations for keeping wages at a point that will deprive employers of any margin of profits on the capital invested, leading to a temporary withdrawal of capital from manufacturing enterprises, and a consequent derangement of the business of the country. It is important to all classes of the community, and more especially to the laboring classes, that this result should be averted. If it is brought about, however, it will be through the mistaken efforts of the workingmen to control the capital upon which they are dependant, and make its interests subservient to those of labor.

There is however one direction in which labor may benefit itself without disturbing the free operation of natural laws, and that is through the establishment of co-

operative associations of skilled mechanics, who will each own an equal share of whatever business is undertaken, and an equal share of the net profits in return for performing an equal share of the labor. Under favorable circumstances, such a plan is practicable, and may lead to the most satisfactory and permanent results. Many conspicuous instances of this are found throughout the country at the present time, although some of the earlier attempts were equally conspicuous failures. The Troy co-operative foundry, for example, is in every sense an entire success. A few years ago a small number of iron moulders, possessing only such capital as they had saved from their earnings, started this enterprise. The first year proved a profitable one, since, in addition to paying more than average wages for the labor employed, a dividend of 82 per cent. was declared on the capital invested in the business. This association now numbers about one hundred and fifty men, and their large and profitable business is increasing every year. Several other co-operative foundries have since been established, two in Troy, one in Albany, Rochester, and Cincinnati, and one in Louisville. In the latter city more than ordinary enterprise was shown by those who originated the scheme. As the capital at their command was insufficient to pay for more than the materials necessary to build the foundry, the iron moulders undertook the work themselves, and completed it without any assistance. Although somewhat rough and unfinished in appearance, the building is well adapted to the purpose for which it is used, and the enterprise is proving largely profitable to all who are interested in it. The Co-operative Cuff and Collar Manufacturing Company, recently organized in Troy, N. Y., is an instance of similar enterprise on the part of the working-men

About twenty laundresses, employed on unsatisfactory terms, undertook to better their condition in this way, and, with a small capital furnished by the Laundry Union of Troy, have started a co-operative factory. The plan is to employ as many sewing women as may be needed, at fair wages, and to carry on the business of both factory and laundry. The enterprise from the start proved amply remunerative, and has received much substantial encouragement—a leading wholesale and retail house of this city having lately contracted to take all the goods that can be manufactured at the establishment.

In the few instances we have mentioned it is shown, that under favorable circumstances, the workingmen in certain branches of industry may greatly improve their condition by the formation of co-operative associations like those above described. It must be remembered, however, that the principle is not one that will admit of universal application. Co-operative enterprises of this character presuppose success, and unless immediate profits can be realized workingmen with but little capital, who are dependent on their earnings for a living, cannot engage in them. In the event of failure, or even of encountering the ordinary difficulties in the way of establishing a new business on a paying basis, they must lose both money and time, besides incurring an indebtedness which could never be paid. This would undoubtedly prove the case in many of our principal branches of manufacture, which can now only be made profitable in instances where the capital invested is sufficient to enable the manufacturer to bear up under losses and discouragements. But in certain departments, where little or no capital is needed, two or three, or four men may associate together in a co-operative enterprise, and, if energetic and determined to perform honestly whatever work is entrusted to them, they may not only make fair wages, but, in time, build up a business.

There are many features in the plan of co-operation adopted in other countries which our trade unions and protective associations would do well to adopt. In England, for instance, the Rochdale people have demonstrated the success of this mode of organization in their great store, the members of which number over eight thousand persons—more than three-fourths of the entire community. In several cities and towns in the British Provinces co-operation has drawn into its system nearly the whole population. Italy, Milan, and Como have also proven the benefits of the system. In the latter city a combination of butchers and bakers to keep up the price of provisions, brought the necessities of life to such an extravagant price that great suffering was caused to the poor. In 1866, Fontana, a workingman, and Vignano, an industrial reformer, started a small store on the co-operative principle. It began with but few members, and in a few weeks over one thousand persons had joined the association. Business was carried on upon the cash principle, and from this small beginning there has grown also a large co-operative kitchen and a bank.

Another method of co-operation is now being tried in Lynn, Mass., with the most satisfactory results. The powerful organization known as the Knights of St. Crispin has undertaken, through its officers, to purchase on the co-operative principle the coal and flour needed by the members. Large quantities of each of these commodities have been purchased at wholesale prices, and transported to Lynn at the cost of the purchasers, and it said that at least \$2 per barrel on flour and \$2.50 per ton on coal was saved to the members thus supplied. In the shoe manufacturing district a number of co-operative stores have also been established, and the most beneficial results have followed. Similar measures might be adopted among the workingmen in all parts of the country.

THE RECENT SESSION OF THE INSTITUTE.

WE have to acknowledge the receipt of the report of the Proceedings of the Third Annual Convention of the American Institute of Architects, held last November, in New York city. It is published in the same unexceptionable style with its predecessors, and contains much that is interesting to architects in general, as well as to those who are connected with the Institute.

Among the instructive papers read on the occasion of this session we will take the liberty of presenting to our readers the following extracts:

Mr. Adolph Cluss, of Washington, D. C., read a paper entitled "THEORY, FUNCTIONS AND INCIDENTAL USES OF CHIMNIES."

"Ancient civilization, to which Architecture is so much indebted in other respects, prospered in the warm climates of Egypt, Greece and Italy, where fires in the apartments were seldom necessary. It has therefore thrown but little light on this branch of science.

"The ancients had no chimnies in their dwellings. The 'Kapodoche' of the Grecian dwelling was most likely nothing but a hole in the ceiling, through which the heated products of respiration of man, and of combustion of charcoal in the braziers then in vogue, passed off, after having mingled with the air, according to the law of diffusion of gases.

"It has been said that history has failed to record the inventor or to define the place where the chimney was first used, but as with other acquisitions of modern civilization, it must be acknowledged that this progress of personal and fireside comfort is rather the result of the combined efforts of generations than of individual men. The apparatus used by the old Romans, in connection with their warm baths, having been lost to the masters of the middle ages, we find the primitive elements of the modern chimney in conical smoke tunnels ascending through the thick walls of castles of the

Anglo-Saxon period in England, when certain necessities stimulated invention; and it is not difficult to trace the transition from these contrivances to the common chimney, of which we find the first authentic record in the twelfth century, in France, in the fourteenth century in Italy, and in the reign of Queen Elizabeth in England, when lady visitors in lordly mansions were frequently sent out to other houses, where they could have the enjoyment of a fire-place, that modern luxury, which is now considered as one of the workingman's wants.

"Chimnies, in the first instance, serve the purpose of effecting a regular and quick access of air to the grate as required for the chemical decomposition of bodies containing a large percentage of carbon and hydrogen, which are called *fuel*. This decomposition gives birth to new combinations, accompanied by development of light and heat, and is called *combustion*. The quantity of air which flows through the grates depends mainly upon the proportions of the chimnies. A second, and no less important function of theirs, especially in our large cities, is to discharge the products of the combustion into the air instead of allowing them to spread over the room. If these gases are visible, as *smoke*, the presence of pure carbon or carbonic oxide, both combustibles, and results of an incomplete combustion, is indicated—the first being a pure waste, and the second in part so, constituting a lower degree of oxidation than the incombustible carbonic acid, the formation of which shows an exhaustion of the heating powers of the fuel. The gases are impregnated with carbonic acid, steam, combustible vapors and nitrogen, as the incombustible part of the feeding air and would be injurious to health if diffused immediately in too limited a height; therefore they must be carried beyond the reach of human abodes, to be

caught and diffused by the currents of the atmosphere, without doing any harm. To serve the latter purpose, the chimnies are frequently built higher than would be necessary for effecting the necessary draft. * * * * *

"Suppose the air in a smoke-stack of forty feet height being heated to 212° F. above the exterior air; its density and weight will then be about three-quarters of those of the surrounding atmosphere. The consequence is that the exterior air will enter the lower end of the chimney with a power equal to the weight of an equal sized column eleven feet in height, since twenty-nine lineal feet of the exterior column weigh as much as forty lineal feet of the heated column. The velocities of the current in chimnies of equal height and with equal differences of temperature, increase with the square-roots of their diameters, provided that the section of the flue from which the warm air enters is at least equal to that of the chimney. Moderately wide chimnies offer, besides, the advantage of cooling off the ascending air less, because the surfaces of contact as elements of the retarding element of friction, are proportioned to the diameters, whilst the volumes of moving air are as the squares of the diameters. Chimnies should, therefore, have a moderately wide shaft, but the upper orifice of their tops, regulating the efflux of the gases, should not be larger than is requisite for a discharge with proper velocity, say ten feet per second, because otherwise cold air would enter, force a downward current by the side of the ascending column, and, besides causing a disadvantageous cooling off, would interfere directly with the draft.

"A proportionably wide chimney, having low velocity coupled with a smaller upper orifice, will, therefore, bring the actual velocity of discharge near to the theoretical velocity. It may reach as much as eight-tenths of the latter, after deduction has been made for friction at the rims and against the side walls of the opening.

"Another agent, besides the heat of the interior column, is the velocity, which increases with the higher layers of the atmosphere and their more or less horizontal direction, tending to carry off the discharging gases.

"The breezes in the higher regions are more regular and stronger than near to the ground, where their movement is weakened and interfered with by friction and many other obstacles.

"But still more important under this head, is the effect of an absolute dilution of the air in the smoke-stack under certain circumstances.

"If the temperature of the air in a smoke-stack is equal to the temperature of the exterior air, and there is no cause for a change of the specific gravity and the pressure of the air on one or both sides, then the column of air within the stack will be at rest.

"But if an atmospheric current, a wind, moves in a horizontal or ascending direction immediately above the mouth of the smoke-stack, then the quiet column of air within presses, with an elasticity dependant upon its atmospheric pressure, against the moving exterior layer of air, which consequently sweeps along the particles of air at the orifice by air-friction. This causes an absolute dilution of air in the stack, therefore a rapid flow of air from the fireplace to the stack, and causes frequently during heavy gales an unusually strong draft in the smoke-stack, even at times when there is no fire and the thermometer shows the air to be colder in the chimney than in the open air; which case is mostly observed in the spring.

"The useful height of a smoke-stack has, however, also a limit, to exceed which will diminish the draft, and which, therefore, must be considered as the maximum height of the stack. The warm air which enters the smoke-stack from the fireplace or furnace cools off whilst rising, thus becoming denser and heavier for a corresponding height of the stack it would finally reach the temperature or

the density and weight of the exterior air. So far the height of the stack helps the draft; with a great height, however, a column of air would exist within the stack which does not differ in weight from the corresponding exterior column, and consequently does not increase the draft. On the other hand, this is objectionable, since whilst lifting this dead column of air, its friction against the walls of the stack must be overcome, and the power required will therefore be lost for the effect of the stack. The height of chimnies in dwellings is determined in most cases by the height of the dwellings themselves, since, generally, they must be exceeded a few feet. Their size is fixed mostly by municipal regulations, which cannot well be altogether disregarded, though they still partake frequently of the character of a law in the reign of the First Edward, when a man was tried, convicted and executed for burning sea coal in London! * * *

"Chimnies for open fire places, besides being conductors of smoke, serve also, the purpose of renewing the air, or ventilating the rooms. If their size is proportioned to one square foot in stem, and contracted to one-half of a square in chimney top, for every three thousand five hundred cubic feet of the space to be heated, they answer, with the average height of our city dwellings, the stated conditions, and change the entire volume of the air in the room five times per hour. The most useful size of chimnies required for good sized parlors are rather large. It is advisable in such cases to have two fires, since otherwise it will be difficult to avoid the backing of the smoke while building the fire. On the other hand, however, no such chimney of any room should have less area than one-half of a square foot. In Russia and Germany, where stoves predominate, flues of no more than six inches in diameter have lately become very popular, without much previous reflection, facilitating, as they do, the task of the designing architect, since with the

molded bricks they need not form any projection, even in a nine inch wall when it is stripped inside. But it is now admitted that, in consequence, the coal dealers flourish, whilst the housewives complain. No flue of any kind should have less than sixty square inches sectional area, otherwise the fuel will be wasted."

MR. WILLIAM R. WARE, of Boston, Professor of Architecture in the Massachusetts Institute of Technology, read a paper on the RELATIONS OF SCIENCE AND ART IN ARCHITECTURAL STUDY.

In discussing which, Mr. WARE spoke as follows: "I said that the question of detail is a matter of experience or experiment, on the point touched upon. My plan is to keep the student constantly, from the beginning, in what I call the *inside* of the subject, and not the *outside*. And my impression is that the experiment, so far as it has been tried, justified the wisdom and sense of the course. The only experiments which have ever come under my personal knowledge, are the methods of instruction employed in the architectural school attached to the School of Fine Arts in Paris, and such elementary experiments as I have been able to make under my own eye. In the French school the young men are thrown headlong into the practice of design. I have myself, among the collection of drawings illustrating the methods of study and work in that school, half a dozen of the early sketches of a young man who afterward attained great distinction in the school, and they are such as a child of five or six might be expected to accomplish—little problems of a shed, a station-house, etc., wretchedly drawn, abominably conceived, showing utter ignorance of the first principles of design. But they had the advantage of putting the young man into the Architect's own point of view, and starting him on that track, and not into the point of view of the historian and connoisseur. So far

as my practice has gone, I will say that the experiment has had a fair success, of furnishing the beginner, who knows nothing of buildings but what he sees in the street, with certain material, as far as may be, classified and arranged, and certain notions of the accommodation and adjustment of that material, and then letting him put this and that together as best he can. I have been in the habit of giving the young men in my charge, a little classified diagram of the very elements of architectural form, the A-B-C's of moldings, and explaining to them their nature. Some of them were suitable for cornice moldings and some for bases. Then I set them to work at once to design something—a cornice, a base, or balcony, or sarcophagus, or garden wall, or whatever you please, as far as their activity of mind will permit them to exhaust the combinations of the subject; and thus see how many different designs they can make with the simple elements; ascertain which they like best; explain how they best can be made; how the designs can be made a little larger, or a little smaller, by giving a curve a greater or smaller arc, and so on. Exactly the same thing may be made very common-place, or very interesting. It seems to me that this plan is very stimulating to the student, that it wakes up his mind, arouses his attention, and makes him feel as if he were a workman."

Mr. RICHARD UPJOHN, President of the Institute, then read the following paper:

THE COLONIAL ARCHITECTURE OF NEW YORK AND THE NEW ENGLAND STATES.

"The progress of Architecture in this country is traceable in the older works before the revolution, and a consideration of its development cannot be treated properly unless we commence at the beginning.

"An investigation of the buildings erected in the Colonial times may show us what foundation we had to start upon

and will call up serious reflections as to whether or not we have made those improvements upon the works of our predecessors which the general progress of knowledge throughout the world seems to have demanded.

"A few of the colonial buildings yet remain—just enough to show us with what care the best of them were built, notwithstanding the very limited development of the country at that time. They give striking evidence of the taste and skill then prevalent. Most of them are built in the prevailing styles then in use in Holland, England, and other countries of Europe. The most ancient of them are those erected in the Dutch Colonies, and are to be found in New York State, and in the States of New Jersey and Pennsylvania. Some of the oldest of them are the churches erected by the Dutch in this city. One of the most prominent is the North Dutch Church, in Fulton street, which has been demolished during the past year. Its history has often been written and is well known. I may also mention the South Dutch Church, now the Post-office, whose days also are numbered. Valentine's History of New York gives a complete and authentic account of these and many other old buildings in the City of New York, and I need not go over such well trodden ground by giving detailed accounts of them. Old Trinity, thrice rebuilt since that time, and St. Pauls, still one of the most prominent landmarks of the city, standing in almost pristine vigor, should not be forgotten in this connection.

"Of domestic buildings of that period scarcely any are left in New York, and none in their original condition. There are several, however, in Brooklyn; and one of the oldest houses now standing in the United States may still be seen in South Brooklyn on Fifth Avenue, near Greenwood Cemetery, with the date 1699 in wrought iron figures, forming the anchor heads, on the outside. It is a brick building, built, as was usual at that time, of bricks brought from Holland, and

laid up with mortar probably made of shell lime. It is remarkable that the gable walls of this house are without coping, but are finished with bricks standing anglewise and forming the zigzag lines still seen on the gables of houses in Holland and Belgium; yet the mortar joints, exposed to the weather two hundred years, are still intact. Albany, a quarter of century ago, had several interesting houses, well worthy of preservation; but the enhanced value of the land on which they stood proved their doom, and they have been swept away, giving place to other structures of more pretentious character, but of very questionable superiority. One of the best residences of those times is that of the Patroon, at Albany, built about 1750. It is a spacious building, well arranged as to plan. It was enlarged and beautified by the late Patroon, Stephen Van Rensselaer, Esq. He applied to the writer for plans, which, being presented to him and approved, were carried out.

"This building too, commands respect for its long and interesting associations with the history of this country. I fear, however, that it will not long be allowed to hold its position, but will give place to the enterprise of the day, (which has very little respect for the works of our ancestors,) and will only be known in history.

"Of domestic architecture we have many good examples, still standing, in the New England States, Boston, Cambridge, Newport, R. I., and New London, Connecticut, all have more or less houses illustrative of the works of the times of which I am speaking, giving evidence of a taste and refinement much superior to that which prevailed immediately afterwards.

"New London was the residence of the famous Governor Winthrop. His house still remains; a good example of domestic architecture, and beautifully located, being placed at the head of a small creek which opens to the harbor of the town, and affords an excellent view.

It is now the residence of Charles Lewis, Esq.

"The Ecclesiastical Architecture of the Ante-Revolutionary days, was, in almost every instance, far superior to that of the period subsequent to the Revolution. Then every trace of refinement, of truthful expression and fitness of purpose, was lost sight of. Not a vestige of sacred thought can be discovered in the houses of worship of this period. Of the Ante-Revolutionary churches, some of the best examples are to be found in Boston, such as King's Chapel, on the corner of School and Tremont streets, Christ Church, at the north end of the city, Brattle Street Church, and Christ Church, Cambridge. These are all worthy of study and will well repay the student for the time which he devotes to them—the King's Chapel especially.

"Trinity Church, R. I., if not altered since I saw it last, still retains the arrangement of the Church as was the usage from the Reformation down to the period of its construction. There is another building in Newport—the Library—also erected before the Revolution. It is a Roman Doric structure, of very good proportions, built of wood, and is still in very good preservation. It is to be hoped that it will be repeated at some future day in stone, that its character may be handed down to posterity. The author of this building, and of several others in New England, was from England. He has left many proofs of his good taste and skill. Providence, R. I., can boast of having the best Renaissance spire in New England—that of the Baptist Church. It has stood the storms of more than a century, giving evidence of faithful workmanship; and the taste displayed in its design is unequalled in the Eastern States.

"Mention may be made, in this connection, of some of the old State Houses. Boston State House, standing in the middle of the street named after it, and fronting on Washington street, is a quaint nondescript building, more

famous for the works done in it than for its architecture. Historical associations and the reminiscence of the building will keep it in good and lasting remembrance. Before leaving this goodly city, I will mention another building famous for the memorial events discussed and public business done within its ancient walls. With Fanenil Hall are associated memories of the early days of the Revolution and of the Independence of the people of this country.

"Newport, the capital of Rhode Island, has a very substantial State House. The exterior is not so permanent in an architectural point of view as was the interior previous to the mutilation to which it was unfortunately subjected. The hall required to be enlarged some years since, and this necessity led to changes which were totally destructive of its excellent character. It is now quite suggestive of white-wash and plaster. These disfigurements ought to be removed before it is too late, and the ancient work should be restored. If more room is required, the style of the original building should be adopted for the additions.

"The residence of the Governors of New York, situated on the corner of Broadway and State street, opposite the Bowling Green, was, before it was mutilated, a very excellent specimen of the first-class houses of the eighteenth century. The Livingston Manor House, on the Hudson River, near Tarrytown, is another example of the houses of the gentry of that century. It has recently gone out of the possession of the family, and considerable additions and alterations have been made to it. Perhaps some one here may be able to tell us more about it, especially with reference to its restoration.

"I might mention many other buildings of this class still standing, several of them in the neighborhood of Newburgh, including the old Hasbrouck House, better known as Washington's Head-quarters, if time would permit.

"The talented Members of the Academy of Design would do well when sketching

and painting their fine landscape, to make careful studies of some of the old houses yet remaining,—houses that will be buried in oblivion in the course of another century, unless faithful records are kept of them by all hands. The reminiscences of the last century, so beautifully pictured in the writings of Washington Irving, have not yet been illustrated in such a masterly way as to do justice to the work of such a clever writer. Pictorial records of the places treated of in his writings should be carefully collated and preserved.

"And let me ask, may we not gain a valuable lesson while contemplating these works of our forefathers? Old and quaint as they are, will we not see by comparing them with the works of our own hands that their authors regarded the law of harmony between a building and its surroundings better than we do at the present day? Careful observation must convince us that in the generality of cases they were ahead of us in this respect, and that in the treatment of country houses, especially, and even the most humble ones, they displayed a sympathy with the beauties of nature seldom expressed at the present time.

"And in this connection I beg leave to give a passing hint to my friends, the Fellows and Associates of the American Institute of Architects, that every design of a house, a barn, a gate or any other thing intended for use, and which is to be seen, enjoyed and thought of, must most certainly be associated with trees, and shrubs, and clouds, and sky; in fact with every thing which makes the glories of nature abound with the richness and fullness of the gifts of God. I say that your designs must participate in the nature of the things by which they are surrounded, and that, if so partaking, they will be, to a certain extent, according to the genius you possess, works of art, and will harmonize with every object that makes the landscape a picture to which your effort is to be as the touch of a master hand; or, otherwise, a blot, a daub,

a wart upon a heavenly countenance. It is useless to attempt to accomplish any artistic work, unless this is duly weighed and considered. You may as well expect a person to become a clever performer of music without an ear, or to gather fruit from a tree that never blossomed. I have used the word "Genius," a faculty, a gift of nature by which we intuitively perceive beauties and harmonies which afterwards we investigate, think and reflect upon, observing the creative energy that is ever

present and going forth in the midst of this terrestrial world of wonders.

"If your action is derived from this source of nature, this stream of light, we shall succeed; it may be, tardily, the effort may be wearily performed, yet it is made, and the work is accomplished,—a step has been taken in advance. This, then, is a beginning of progress in the path of increasing knowledge, which, if industriously followed, will certainly ensure success."

FREE SCHOOLS OF INDUSTRIAL ART IN MASS.

A PLAN has been suggested to the Massachusetts Legislature, in which the Board of Education is now engaged, looking to the establishment, under the auspices of the Commonwealth, and as a branch of the public school system, of evening schools in all the larger towns, which shall give instruction to young persons in what are coming to be called technically the "Arts of Design." It is proposed to give to the children and youth throughout the State, at the general expense, the same advantages that private beneficence and foresight have shown to be so advantageous in some localities. Of course the matter had been studied in some detail before it assumed the form of a petition to the legislature, and the petitioners are able to state with a considerable degree of precision what they think ought to be done in the premises.

The strong point of the plan is to make it an accessory, or rather a part of the accepted town school system. Every town of a certain size is to be required to maintain an evening school for the education in "the industrial arts;" and, indeed, schools enough for ten out of each thousand of its school population. At the same time these schools are to be under the general advice and control of an officer, to be appointed by the governor and council, with such hope that a

good public servant may be a permanent one, as is implied in his holding his position at the executive discretion, who is to be *ex officio* a member of the Board of Education.

These are the two great features of the plan: to throw the expense, the interest, the detailed management, the credit and profit of results upon the separate communities; and to have an able, active well-informed central authority to guide, superintend, and inspire the whole new movement. In detail, it is proposed that each town which establishes one of these schools shall have a local "secretary" acting with the school committee, to manage the affairs of the school and report to the "secretary-general." This officer will be expected in the first instance to organize, and afterwards to carefully and individually superintend the new enterprise.

It is proposed that in every town where such schools shall be established, they shall be open for two hours, for five evenings in the week; and that there shall be a competent master or mistress for every twenty-five pupils. Instruction is to be regularly provided in free-hand drawing, and mechanical drawing,—including studies of ornament, the human figure, working drawings and details, machines and their parts, and buildings and their parts. Carving, modelling,

and other branches, with descriptive geometry, and the elements of perspective and shadows, may also be taught. It is suggested in the bill prepared by the petitioners, that the pupils shall be of not less than ten years of age, and that they shall enter their names for at least two specified evenings a week. In case there is no space for all applicants those claiming the most lessons shall have the preference. They are to be divided into sections for the prosecution of the different branches of study, and into divisions with regard to their proficiency and progress. For this purpose monthly examinations for promotion are provided, and it is proposed that the most meritorious drawings should be "posted" in the rooms and reported to the central authority.

One great duty of the general secretary would, of course, from the first, be advice or direction as to the proper models and copies to be furnished by the several schools and masters to their pupils. It is proposed that in addition to this duty, necessary for each local school, he shall be directed to form two collections of models which may be used for the general benefit. One of these, which might be called the "loan collection," would be of such models and casts as would be needed by the more advanced pupils, but which it would not be convenient or necessary for each local school to possess permanently. This collection, or parts of it, could be temporarily deposited on proper application, with such schools as could make it useful.

The other proposed collection, which might be called the "State Travelling Collection," is intended to contain examples illustrating the application of the arts of design to manufactures. The articles composing this collection should be placed in boxes suitable for transportation, and for exhibiting them without unpacking at any place where they might be carried. The transportation from one town to another should be at the expense of the Commonwealth, but each town

would provide for the protection and exhibition of the collection, during its stay with its own schools.

These are the main features of the plan recommended to the legislature. It is proposed to give the secretary-general a fixed salary, with his office and travelling expenses; and to authorize him, in connection with the local secretaries, to affix marks of honor to the best specimens of work done by the pupils, and to exhibit such specimens, in connection with the travelling collection or otherwise.

The details of such a plan are of course subject to much modification, and are capable of improvement; but we have great confidence that the Massachusetts Legislature will organize schools for this purpose, and much upon this system, at its present session.—*Old and New.*

FATHER MULOOLEY, an Irish priest, has discovered under the Church of San Clemente, at Rome, an ancient chapel erected in his own house by Clement I. the fourth Pope, from A. D. 91 to 100. The present church was built on the site in the year 1108. Traces of its existence were first discovered in 1867 by Protestant archaeologists, which led to the present exploration. The ancient building had apparently been purposely filled up, but has now been brought to light. It is divided into three naves divided by rows of columns—still standing—of the rarest marble. The walls are covered with frescoes representing scenes from the lives of the saints, and some of them as fresh as if executed yesterday. They date from the third, the ninth and the tenth centuries, and are the most ancient and the largest known, except those of the catacombs. A most singular circumstance is, that beneath this curious relic other remains, belonging to the Roman Pagan epoch, have been discovered; several chambers, which perhaps formed part of the house of Clement I., and various other mural constructions in brick, most distinctly indicate the three different periods.

THE NEW STATE DEPARTMENT BUILDING.

THE commissioners appointed to examine and select plans for the new State Department building, consisting of Secretaries Fish, Belknap, and Boutwell, Supervising Architect Mullett, Edward Clark, architect in charge of the Capitol extension, and General Michler, met at the State Department, and after a long consultation determined to adopt the plans submitted by Mr. Mullett, and to accept as the site for the new building Scott square, bounded by Fifteenth, H and I streets and Vermont avenue.

The building proposed will have a front of two hundred feet by eighty-five feet deep, and will be three stories high, with attic and basement, and the style is the French renaissance, with Mansard roof. The central portion projects, and is crowned with a bold pavilion, carried up to a height of ninety-five feet; to the main cornice the height will be fifty-five feet, and to the top of the attic story seventy-five feet. The corners of the building will be flanked by pavilions, and the centre and corner are connected by a *loggia*, which is also carried around on the front.

A terrace balcony will extend along the main front by the suite of rooms for the Secretary on the second floor. There will be about fifty rooms in the building, besides the attic, which will be fitted up for the files of the Department, and the basement will be used for the heating apparatus and storage of fuel. There will be two halls in the building—one lengthwise with the stairs and entry, and the other crossways. An octagonal rotunda occupies the centre, and around this will be grouped the water-closets, bath-rooms, &c. The building will be entirely fire-proof, with tiled floors, the doors and windows finished with natural wood. It has not been determined of what material the new building will be constructed, but it is probable that granite will be selected.

The plan proposed for locating the offices of the President and the Executive Department in the new State Department building has been abandoned.

THE ST. LOUIS INSTITUTE.—Before going to press, we received with compliments of George D. Rand, Esq., Secretary and Librarian, the Constitution and By-Laws of the above Institution, which it will be seen in a preceding part of this month's REVIEW (page 507); we speak of as a *chapter* of the *American Institute of Architects*. It now appears that the St. Louis Institute is a specially incorporated body; wholly distinct from, and independent of, any other.

"The organization of this society was completed on Tuesday evening, January 11th, at a meeting held at the office of Randolph, Bros., by the election of officers for 1870. The following were elected: President, Thomas Walsh. Trustees, M. Randolph, John F. Mitchell, George I. Barnett. Secretary and Librarian, Geo. D. Rand. Treasurer, R. Desbonne.

"A vote of thanks was then passed to the chairman, Mr. Mitchell, and to the secretary *pro tem.*, Mr. Randolph; also a vote of thanks to the Messrs. Randolph for the use of their offices; and the meeting adjourned.

"The next regular meeting of the society was held at the office of Randolph, Bros., on Tuesday, January 18th, at eight o'clock P. M. The office of the secretary, Mr. G. Rand, is at 305½, Olive street."

It is proposed to erect a new light-house at Flynn's Knoll, in the lower bay of New York, at a cost of \$200,000, and another at Cliffwood Point, N. J., at a cost of \$15,000. The site of the light station on Execution Rocks is to be protected from the sea at a cost of \$8,000.

COURT HOUSE FOR FITCHBURG, MASS.

FITCHBURG is the half-shire town of Worcester county, having been accorded this privilege and honor a few years since, by the Legislature of the Commonwealth. In 1857 and '58, a substantial jail was built for the use of the town and vicinity, and arrangements were made with the town authorities to use their spacious and commodious Town Hall for holding courts. These accommodations proving inadequate for the great increase of business incident to the rapid growth of all sections, especially Fitchburg and the northern part of the county, the commissioners for said county have obtained the necessary legal authority, and have decided to erect a building in every way commodious enough for the present, and prospective wants of this half-shire town and the interests centering there.

The building is to be of stone; its greatest length is ninety-six and one-sixth feet, its greatest width eighty-six and one-half feet.

The architects are Messrs. E. Boyden & Son, of Worcester.

The style chosen for the exterior decoration and form is the Victoria Gothic. The body of the building is to be constructed with a dark colored Fitzwilliam granite, having clean fresh quarried pointed face, bed and build. This stone has somewhat the same color as the Quincy granite. The trimmings are to be of the very finest colored greyish white granite, for which many of the Fitzwilliam, and Marlboro, N. H., quarries, are so justly noted. The trimmings are left fair quarried face, cut or tooled, according to the design of the architects. The entrance is to be ornamented by columns made of red porphyritic granite.

The roof is to be covered with slate, and horizontal angles, and ridge surmounted by iron crest railing.

The basement is to be used for the Police court of the town of Fitchburg, Janitors-room, heating arrangements, etc.

The second floor for the Register of Deeds, Probate Court, etc.

On the third floor, or second above the basement, is the Court-room proper, with the Jury rooms, Judge's room and Law Library; and having all those comfortable appendages of closets, etc., which go to make the administration of law easy and smooth, especially to those who administer it.

The contractors are,—for the stone work, D. A. Bates, and for the brick work, Messrs. Derby & Witherby.

Fitchburg, Mass., Feb. 1870.

The above communication received too late to classify.

A FRENCH paper gives the following account of the origin of the expression "to make a complete fiasco." A German one day seeing a glassblower at his occupation, thought nothing could be easier than glassblowing, and that he could soon do it as well as the other. He accordingly commenced operations by blowing vigorously, but could only produce a sort of pear-shaped balloon or little flask (fiasco). The second attempt had a similar result, and so on until fiasco after fiasco had been made. Hence arose the expression which we not unfrequently have occasion to use when describing the result of our private and public undertakings.

THE building in Quincy, Ill., during the year 1869, has been such as to indicate a rapid and healthy growth. About two hundred and fifty buildings have been erected at a cost of nearly \$800,000. The Quincy *Whig* thinks the city will contain sixty thousand inhabitants in less than five years.

THE NEW NEW YORK POST-OFFICE.—The new Post-Office inclosure has no longer the busy aspect which it once presented. The night work long ago ceased entirely, and only ninety laborers are employed during the day, these mostly in laying concrete. A number of the granite supporting piers for the main building have been erected, and marked and fitted stones for others lie about, only waiting industrious hands to lift them into place. But the edict is imperative, The appropriation is nearly expended, and the penalty for exceeding it is a heavy fine and imprisonment. At the end of this month all the remaining men will be discharged, and the work will cease entirely until the slow wheel of legislation rolls round another appropriation. The cessation of work will be very expensive, not only on account of the large amount of property that must be housed, and the injury which the exposed stock will suffer from the weather; but on account of the stoppage at the granite quarries, whose men have been collected at great expense. Still, the condition is not unprecedented. When building the Treasury extension in Washington, the architect was once delayed a period of three months by a similar impediment, and was only able to proceed at length by the generosity of a capitalist who, on his responsibility, lent \$100,000 for the prosecution of the work. A correspondent, who probably wanted the site farther up town, is encouraged by the lull in the work to send a communication endeavoring to prove that the city had no right to dispose of the Park land. The argument, however, is not a very conclusive one, and apparently does not include any points not disposed of during the negotiations which took place when the land was bought.—*Tribune*.

THE Marine Hospital in Wilmington, North Carolina, erected before the war, at a cost to the United States Government of \$40,000, was sold at auction lately for \$4,900.

HYDRAULIC CEMENT.—An improved cement which perfectly resists the action of water, and is designed for the ornamentation of buildings, has been proposed by Mr. J. A. Dubus, of Paris. The principal component parts are lime, silica, and alumina, the two latter being extracted from refractory clays. In order to bring about the formation of the double silicate of lime and alumina, sulphuric and boracic acid are added in small quantities. The proportion of the constituents are varied, according as the cement is required to set slowly or quickly. The proportions of the substance in the anhydrous state are—fat lime of first quality, 67-96 to 74-65; refractory, 27-18 to 42-89; sulphate of lime, 4-76 to 9-06; and boracic acid, 0-10 to 0-40. These set with varying rapidity, but are of equal quality, and ultimately attain the same degree of hardness. The substances are mixed, after being ground to a fine powder; they are then made into bricks with water, baked at a white heat, and reduced to an impalpable powder, which is mixed with water, and used as cement.—*British Trade Journal*.

NEW YORK STATE CAPITOL.—Some idea may be formed of the amount of work on the new capitol at Albany when we state that already nearly one million and a quarter has been expended on it. The foundations alone have cost over half a million of dollars. A further sum, of one million, three hundred thousand dollars, was required of the Legislature for the continuance of the work.

HYDE PARK, L. I.—Miss Charlotte Kelsey, who owns about 600 acres of land at this place has made a present to the Long Island Railroad Company of a suitable site on which to erect a depot. The land is at the corner of the western end of Mr. A. T. Stewart's property. The Company intends to erect a commodious station-house for passengers.



EDITORIAL ITEMS AND CORRESPONDENCE.

FINE ART EXHIBITIONS.—The lovers of the pictorial are occasionally regaled with an artistic treat at Earle's Galleries in this city, the latest of which is worthy of notice, if it were on no other account than that of the singularity of the idea sought to be wrought out on canvass, namely: the personification of American female beauty, under the mythologic characters of the Nine Muses. To this end the artist, Mr. Joseph Fagnani, has drawn from nature, and selected nine subjects from ladies gracing our best society. Of course, under the circumstances, we are not to be too critical, and will, therefore, review the ladies in our kindest way.

URANIA, the patroness of Astronomy is seated in queenly attitude, having a bright circlet of stars upon her brow, and her azure robe looped with a crescent, her left arm is resting on a celestial globe, while in her right hand she holds a rod. On the whole it is aptly chosen and personified.

THALIA, carrying in one hand a grotesque mask, typical of her comic part, while with the other hand she holds up her robe,—is scarcely done justice to. There is a drowsiness over hanging the fair deity that makes us fail to recognize her well known character.

POLYHYMNIA, who divinely reigns over sacred poetry and eloquence, is well portrayed; leaning her head upon her left hand, and holding in her right a roll of parchment. On one side is a tripod and on the other a lyre.

CALLOPE, Goddess of Epic Poesie,

wearing her golden diadem, and holding a partially unrolled MS. of Homer's Iliad in her right hand, while in her left she bears an ivory trumpet; is in our opinion, the best of these emblematic portraits.

ERATO,—she who spiritually presides at all marriage feasts, and matronizes pantomimic dancing, is awkwardly *poséd*; an unpardonable fault in one whose every grace should be imparted to her delightful calling.

MELPOMENE, the heavenly queen of Tragedy, lacks that dignity of expression her awe-inspiring empire should command, while **TERPSICHOE** is exceedingly well rendered.

CLIO, the histrionic muse has a whining expression of countenance, and the coloring of the drapery does not harmonize with the delicate cast of the features.

FINALLY, or **NINTHLY**, the pleasure giving **EUTERPE** is not *all pleasing* in her presentation here. The *posé* is faulty.

As a *tout ensemble* we object to the total absence of contrast throughout; the complexions being the same, or similar in all.

Mr. Fagnani might have been much more successful if he had drawn his inspiration altogether from the heaven of imagination rather than the paradise of earth.

NEW YORK has been enjoying an exhibition of water colors at the National Academy of Design, and among the collection we noticed several of high merit, from the hands of Philadelphia artists; among them, "Lake Avernus," by Mr. W. T. Richards, a subject well conceived and exquisitely handled. We must also notice "The Hour Before Dinner," and the "Chapel of Haddon Hall," by an English artist, Mr. Samuel Raynor, both *gems* of taste. Many prominent artists were represented, such as Rowbotham, Falconer, Fredericks, Nicol, A. H. Wyant, F. O. C. Darley, J. S. Prout, Mr. John Callow, etc., but time and space both fail us. This art has been carried

to its present perfection as well by American as English artists, (the latter, however, must be accredited with its creation), and though lacking the tone of oil colors it has many attractive features.

PHOTOGRAPHS of the hotel at Norfolk, Va., and the Louisa Home, for aged women, Baltimore, have been received from Mr. E. T. Lind, Baltimore; also, Suburban Villa from Carl Pfeiffer, Esq., N. Y., and Catholic Cathedral from Mr. Charles E. Fowler, New Haven, Conn., all of which are in the hands of engravers, and will illuminate the pages of the REVIEW in due season.

OUR NEW CITY HALL.—The Public Building Commissioners, Committee on Contracts of this city, held a meeting recently, to receive and open proposals for work and materials required in the erection of the Walnut street portion of the new public buildings. James V. Watson, Esq., Chairman, presided. The following were the bids received:

EXCAVATIONS.

Daniel McNichols, per cubic yd.	80 cts
Hugh McConnell, " "	90 "
Edward McCaffrey, " "	98 "
Patrick McDonough, " "	82½ "
G. H. Brinkworth, " "	\$2.50 "
Samuel Scott, " "	90 "
James Armstrong, " "	79 "
Hood, Lally & Carroll, " "	1.25 "
C. E. McNeil, " "	87½ "
Murrell Dobbins, " "	90 "
Wm. Cromley, " "	83 "
James Duffey, " "	1.25 "
Michael Smith, " "	1.40 "
E. S. McGlue, " "	1.60 "

BUILDING WALL.

Reuben E. Diemer, per perch,	\$4.25
Copeland & Browning, " "	2.48
G. H. Brinkworth, " "	12.75
Samuel Scott, " "	1.60
James Armstrong, " "	1.55
Bedina Stone Co., " "	4.95
C. E. McNeil, " "	3.30

Murrell Dobbins, " "	6.00
H. Bitting, { Large Stone,	4.75
	{ Small Stone, 3.25
James Duffey, { Large Stone,	6.00
	{ Small Stone, 5.00

BIDS FOR STONE.

Conshohocken Stone Co., 40 cts. per cubic foot, \$2.90 per perch, for building stone.

Nathan Davis, 38 cts. per cubic foot, \$2.78 per perch for building stone.

Samuel Gorgas, \$2.35 per perch for building stone.

James Armstrong, 33 cts. per cubic foot, \$3.00 per perch for building stone.

McClenahan & Bro., 34 cts. per cubic foot.

A. O. & J. A. Deshong, 41 cents per cubic foot, \$3.47 per perch for building stone.

Leiper & Lewis, 50 cts. per cubic foot. 1 man \$2.80; 2 men \$3.30; 3 men \$3.80.

Bedina Stone Co., all stone \$5.00 per perch.

J. C. Leiper, 35 cents per cubic foot, \$3.70 per perch.

G. W. Jacoby, 38 cts. per cubic foot, \$2.70 per perch.

The contracts have been awarded, but as there exists some doubts as to final location of the buildings, and consequently concerning the authority of the committee, they await endorsement by the City Councils.

WE have received the following communication and insert it for the benefit of our professional readers.

MR. EDITOR: It seems to me, on reading the annual proceedings of the American Institute of Architects, which met some months since, in this city, that there was a vast deal of unnecessary argument thrown away upon the question of "professional fees." The peculiar feature of the difference exists in the misunderstanding of the expression, "preliminary studies." Now, the definition of the word *study*, as given by Dr. Webster, ought to satisfy the most

fastidious as to its intent and meaning. That eminent author says:

1. "A setting of the mind or thoughts upon a subject; hence, application of mind to books, to arts or science, or to any subject, for the purpose of learning what is not before known.

2. "Exclusive mental occupation; absorbed or thoughtful attention; meditation; contrivance." From which it is easy to understand that these "preliminary studies" constitute the mental effort or design which is to be afterwards mechanically arranged in order to its construction. Such studies then, are not loose disjointed flashes of imagination, but accurately considered skeleton designs, upon which something approximating to a fair estimate can be founded, which may guide a client to a safe conclusion as to probable expenditure.

"Preliminary studies" should consist of plans and a perspective (or perhaps two), and a section to define heights, mode of internal construction, etc. A short general specification is likewise necessary to enable a builder to form his estimate.

For such "preliminary studies" a charge of *one per cent.* is fair, because mental labor has been duly bestowed upon them, and they form an actual, tangible design. But, a crude sketch is unreliable, and really unworthy of any specific fee. It may be good to look upon, yet utterly impracticable.

But, the professional man has to guard himself against the probability of having his design, in the form of a preliminary study, taken to another office; or, perhaps, put into the hands of some presumptuous builder, and cut up and altered to suit convenience, etc. Now, to avoid this there are two ways, the one is for the Architect not to let the "study" go out of his office, and the other is, to make the "study" to a secret scale, such as *fifth*, *tenth*, or any that is not in common use, or to be found on the carpenter's rule. If the design is to be carried out by the Architect who

made the preliminary study, then there will be no distinct charge for it. But, if not to be immediately acted upon, and should the client desire possession of this study, then it should be left to the Architect to make his own charge, according to the time and thought expended upon it. There are many small things that give full as much trouble in the arrangement of parts as large ones, and *one per cent.* on their whole cost would not pay at all as well as *one-fourth per cent.* on the estimates.

NEW YORKER.

QUERE.—Can any of our readers inform "An Enquirer" where Adam's Graining Machine is to be had?

W. A. M., Montrose, Penn.—Answer. The module may be the whole or the half of the diameter of the column, and may be divided into any convenient number of parts, such as 60, 30, or 24. Authorities differ in this practice. You must wait for the elucidation of the Ionic and Corinthian capitals, which will appear in due time. Any seeming discrepancy in the minute scaled illustration of the orders, given in No. 7, will then be cleared up.

There is no public school of architecture for beginners. Boards of Education have not yet thought of such a necessity.

A. K. P.—Dexter, Mich.—Answer. In reply to your question as to the construction of houses in frame and brick, we have only to say that it is not at all uncommon. The studding is usually 4×2 , or 3 inches. This work is what is termed "brick nogging." It is sometimes laid *dry* and otherwise with mortar joint. When laid *dry* the practice of driving a twenty-penny nail half-way into the studs, at every third or fifth course, is a very necessary precaution. But, this cannot well be done where mortar joints are used, inasmuch as the shrinkage of the mortar in drying would

cause a fracture where the nails were driven. This mode of walling demands board-siding (either clap-board or vertical), although it is often plastered and rough-cast on the outside.

OWING to a delay in the engraving of the perspective of the Court House at Freeport, Ill., we are obliged to substitute "A Suburban Villa" as the frontispiece for this month, the description of which will appear with the delinquent engraving in next month's issue.

AMHERST STONE.—We extract the following interesting report from a letter from the state Geologist of Ohio, Dr. J. S. Newberry.

In preparing for my lectures on Economic Geology, in the School of Mines, New York, I have had occasion to investigate the qualities, uses and reputation of most of the building materials employed in this country, native and foreign, and since the organization of the Ohio Geological Survey, have naturally given special attention to such as are found and used in our State.

The Amherst Stone I have been familiar with for many years; have carefully examined all the quarries which furnish it, at and near Amherst, as well as at all other points where the stratum from which this stone is derived is opened. I have also seen it used and applied to a variety of Architectural purposes in all the larger cities of the North and East, and have consulted a great number of Architects and Builders in regard to its merits.

The result of such observations and enquiries as I have made in regard to the Amherst Stone, has been to convince me, that, in value and reputation it is second to no other building stone yet discovered in this country, and that it is destined to grow still farther in popular estimation and use.

The value of the Amherst Stone depends upon the following qualities, which it possesses in an unusual degree:

1st. **DURABILITY.** It is chemically, nearly pure silica, and is scarcely more affected by weathering than granite. It is also very refractory, and will endure exposure to fire, by which granite or marble would be entirely destroyed.

2d. **STRENGTH.** This varies from 6,000 to 10,000 lbs. to the square inch, (from two to four times that of the best brick), at least sufficient to endure any weight modern architecture will put upon it.

3d. **COLOR.** This is light drab, warm, cheerful, uniform and unchangeable.

4th. **TEXTURE.** This is fine and homogeneous, without flaws, pebbles, or clayballs; while containing the quarry water, it works as the stone cutters say, "like cheese," but hardens on exposure and retains every inscription with the greatest fidelity.

These qualities are rarely found in as great perfection combined in the same stone, and are such as fully warrant the high reputation it enjoys.

I have witnessed the use of the Amherst Stone in New York City, for the last three years, and find it is there very highly esteemed, both for its intrinsic merits, and for the pleasing variety afforded by its light cheerful tint, to the somewhat sombre monotony of the "Brown Stone."

The other uses of the Amherst Stone are scarcely less important than those to which I have referred.

It is now furnishing two varieties of Grind Stones, which have no superior in the world; the first, heavy stones for large work; the other, the American Wickersly, a rare and valuable variety used for grinding saw plates, etc.

Cleveland, Ohio, February 1, 1870.

MERRICK & SONS.—Architects and Builders, as well as all parties concerned in the erection of ware-houses, stores, foundries, etc., should make themselves acquainted with the merits of the patent *Safety Hoisting Machine*, manufactured by this company at 430 Washington Avenue, Philadelphia. It is unquestionably the most effective machine of the sort we know of.

IRON DOORS.—We paid a visit to the establishment of Messrs. J. Watson & Son of this city, and inspected the iron doors manufactured there, from the design of E. E. Myers, Architect, Springfield, Illinois, for the new Court House at Carlinville in that state. They are double doors, five feet nine and three-quarters, by fourteen feet three inches in the clear. Two long semi-circular headed panels, filled in with smaller panels in forms of circles, and oblongs, with inverted segment ends form the design. These doors are of wrought-iron plates, the panels being solid and the framing hollow. The moldings around the panels are of cast-iron, as is the ornamental filling of the inner panels, all very sharp and clean. The work is really very good, and highly creditable to Messrs. Watson & Son.

ACCORDING to Reinsch, timber may be rendered incombustible by saturation with common salt, as well or better than by the use of water-glass, and a further advantage from salt thus applied, is a prevention of damage from certain insects.

SOME of the buildings at Parker's Landing are built on stilts to guard against high water. Boatmen sometimes use the leg of a house for "snubbing posts," which generally enrages the tenant, and sometimes causes disturbance.

ALUMINUM BRONZE.—Workers in metal do not seem to become weary in their praises of the virtues of aluminum bronze, especially when composed of ten per cent. of aluminum and ninety per cent. of copper. Its color resembles eighteen-carat gold, and it is capable of receiving a polish far superior in beauty to that of any gilding. This ten per cent. bronze may be forged like iron or steel, either cold or hot, and becomes very compact under the action of the hammer. It can be rolled into sheets, or drawn into wire or tubes of any diameter. Its specific gravity is about that of iron. It is acted upon by atmospheric influences less than any metal or alloy, except gold, platinum, and aluminum. It is tougher than iron, very stiff and elastic; and, in short, possesses a vast category of the highest value.

It is now much used for watch movements, as well as for the articles for the table—such as spoons, forks, cups, etc.—*Harper's Magazine*.

DEDICATION.—The new R. C. Church of the Holy Innocents, Thirty-seventh street, near Broadway, New York, was recently dedicated. The façade of the church is a mixture of Gothic and Byzantine architecture. It is elegant and imposing. The length of the building is one hundred and twenty-five feet, width seventy feet, height sixty feet. Large and commodious galleries and pews afford seats for fifteen hundred people. Over the organ gallery is a singularly handsome rose window. Altogether, no less than seventy stained windows reflect both light and beauty in mellowed rays. The doors are unreasonably small, and, in case of a panic, dangerous. A large fresco, by the Italian artists Bromedio and Garibaldi, representing the crucifixion, reaches from the altar to the roof, and strikes the beholder very forcibly as he enters. The wood-work is chestnut and black walnut. The walls are of brick, and the front of Belville and Ohio stone.

NEW GOVERNMENT OFFICE.—A bill was introduced in the House of Representatives, the 21st of February last, creating the office of Government Architect, and providing that that officer shall be appointed by the President, by and with the advice and consent of the Senate. He shall have a salary of \$3,500 per annum, and travelling expenses; shall be under the general control of the Secretary of the Treasury. The bill abolishes the offices of Supervising Architect of the Treasury, Architect of the Capitol Extension, and Commissioner of Public Buildings, and transfers all the duties of the same to the Government Architect.

THE buildings of the Insane Asylum in South Boston, Mass., and those of the Kerney Hospital, in the same place, were somewhat damaged by fire on the 25th ult., the former to the extent of \$5,000, and the latter of \$1,500.

MR. A. T. STEWART has purchased 1,000 more acres of land at Hempstead Plains, and now owns 8,000 acres there in one symmetrical tract. He is having it laid out in squares and roads.

THE Atlanta "New Era" says that scarcely a Western train leaves that city without bearing with it a number of Georgians who are bent upon seeking fortunes in other States.

THE New Depot for the Harlem and New Haven Railroads in New York is to cover very nearly four acres of ground.

THE Italians in Memphis are making arrangements to erect a handsome monument in Court square to Christopher Columbus, the discoverer of America.

PHILADELPHIA has invested twelve million dollars (half paid) in sixteen street railways, which have two hundred miles of track.

BUSINESS is brisk in Chicago. Retailers are increasing their deposits, and wholesale men report a good trade.

BOSTON is again talking about erecting a soldiers' monument on the Common.

A New opera house has just been completed in Scranton, Pa. J. C. Snyder, of this city, was the architect. Upon each side of the main entrance will be a store one hundred feet in depth; the second and third stories being devoted to the audience-room. The interior arrangement of the opera house is modeled somewhat after the Chestnut-street Theatre. There is to be, but one gallery. The stage is to be thirty feet in depth, and will contain all the most approved modern appliances. The height of the ceiling in the audience-room will be forty feet from pit to dome. The opera house will accommodate from fifteen to eighteen hundred persons, and will cost one hundred thousand dollars.

IMITATING DARK WOODS.—The appearance of walnut may be given to white woods, by painting or sponging them with a concentrated warm solution of permanganate of potassa. The effect is different on different kinds of timber, some becoming stained very rapidly, others requiring more time for this result. The permanganate is decomposed by the woody fibre; brown peroxyd of manganese is precipitated, which is afterwards removed by washing with water. The wood, when dry, may be varnished, and will be found to resemble very closely the naturally dark woods.—*Harper's Magazine*.

FURNACE SLAG.—In Belgium, furnace slag is now utilized by allowing it to be run off into moulds along the sides of the furnace, in which it assumes the form of rectangular blocks of any size. When cold the mass forms a compact, homogeneous slag, very much resembling porphyry, and equal, for building and engineering purposes, to the best natural stone that can be procured from the quarry.—*Ib.*

TELEGRAMS from Idaho report extensive gold discoveries near Rio Grande. The diggings are principally on the middle fork of the Leon River.

APPLYING PAINT TO PLASTER CASTS.—Porous plaster or stone may be rendered compact, and fitted to receive paint, by applying a coating of one part albumen in five of acetic acid. The result is a fine, firm, adherent skin, upon which the paint may then be laid.

THE Jersey City bricklayers decided to resist the attempt of the employers to reduce wages from \$5 to \$4 a day.

LITERARY MATTERS.

THE RURAL NEW YORKER: D. D. T. Moore, Rochester, N. Y.—This able and very popular journal lays on our table, and is filled with matters of interest and profit to farmers, and all that large class of urbanites having rural proclivities. As a family journal it is a success, presenting historical, biographical and descriptive sketches of interest with each edition. The cent of the Dome of the Invalides which we present with this number of the REVIEW is from the pages of the "New Yorker."

THE LAND OWNER.—devoted to Landed Interests, Building and Improvement, and published in Chicago, by J. M. Wing & Co., partakes of the enterprise incident to that climate, and is well edited. It is the official organ of the National Board of Real Estate Agents.

"STEIGER'S LITERARISCHER MONATSBERICHT," is on the plan of the American Literary Gazette, and contains full summary of the monthly German publications, besides correspondence from various localities in North America and Europe. To American students of German literature as well as to our German population, this publication must be of great value. E. Steiger, 22 and 24 Frankfort street, New York.

OLD AND NEW is received for March and contains an immense amount of literary food, daintily flavored, well prepared, and attractively set out. The article on "What a Young Man Needs in College," should be wide spread, as it contains valuable suggestions to the youths of the country. H. O. Houghton & Co., Boston, Mass.

MORGAN'S BRITISH TRADE JOURNAL, is well known as the expositor of the mercantile community and the trades, and we have only to say for it, that it is highly prized as an exchange.

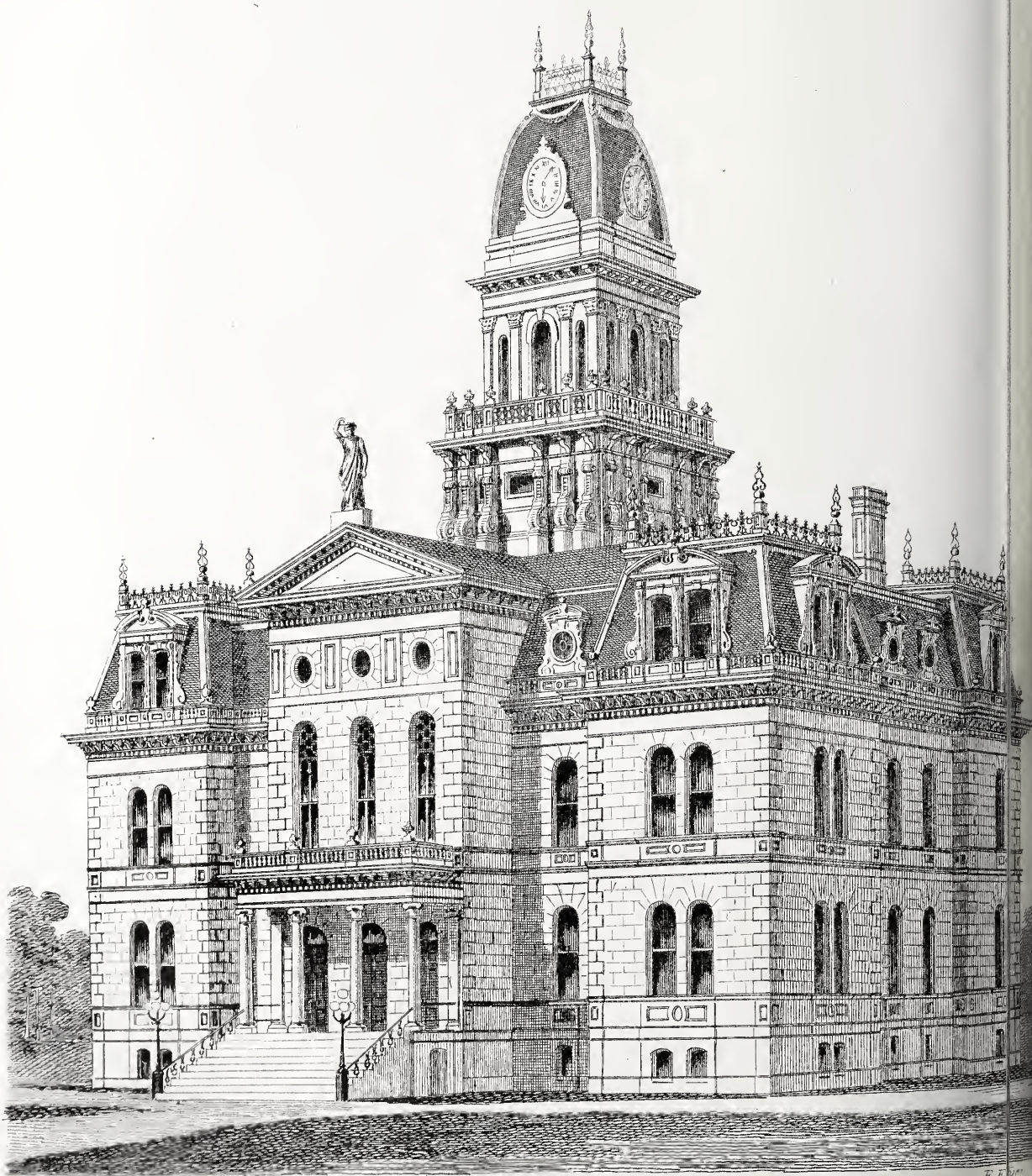
THE LIVING AGE, for the week ending February 19th, is an exceedingly interesting number, besides its unusual large amount of the best scientific, literary, historical, and political matter, it is publishing two new and very interesting serial stories; one by Mrs. Oliphant and the other by Charles Lever.

The regular subscription price of this 64 page weekly magazine is \$8 a year. Little & Gay, Boston.

"NATURE."—A scientific weekly publication from the house of MacMillan & Co., London. This periodical is in its infancy, and evinces such erudition and wisdom as proclaim it the offspring of great minds. It treats on Astronomy, Agricultural Chemistry, Entomology, and other sciences, and should be on the table of all American libraries.

THE EUROPEAN MAIL, gives a complete summary of home and foreign news, besides a shipping and commercial list, literary and art criticisms, and is valuable for the information it contains for merchants and traders,—it having six distinct issues for different portions of the globe,—as well as for the drawing rooms of those who desire to keep posted on foreign politics, religion, art etc. —Published in London.





FREEPORT COURT HOUSE III

see page 504.

THE
ARCHITECTURAL REVIEW
AND
BUILDERS' JOURNAL.

NATIONAL ART EDUCATION.

THE persistent and ever praiseworthy efforts for which Boston is noted, of advancing the practical education of the community in matters of art, should find a ready co-operation in all our leading cities throughout the Union. A writer in a recent number of that clever monthly, *Old and New*, remarks: "Art has been and still is very generally regarded as a matter of pure luxury, and quite apart from the every day business of a working people. But it would be difficult to prove that it is any more apart than the literature or science which is admitted to be a necessity of the most humble school systems. How does a course of elementary physics help a man forward in a life of trade or mechanical work more than a study of the Parthenaic frieze? How does a poem of Wordsworth, or a speech of Webster committed to memory from a 'First Class Book,' prepare a boy or girl for the business of life more directly than a picture of Edward Frère, or a photograph of a Gothic cathedral?"

This is the common sense view of the case as it stands. Why study that which is a glittering acquirement rather than that which is a practically useful acquisition? Are the "whys" of mental philosophy to drown in their absorbing echoes the "wherefores" of practical science?

It is easy to see where the national taste leads. Only take as a proof of its bias for art the simple fact that, without illustrations, no publication can at this day contend for popularity with the pages of those embellished with illustrations. And, furthermore, this taste for art is so certain and so progressive, that the designs which passed current as good twenty years ago, would not be tolerated at all now. Nay, the people grow critical as this art-taste is cultivated, and the studied labors of the best engravers, and the choicest designs of the most talented artists, are what they look for, and must have.

Adopting these signs as reliable, we hail the effort of our sister city, Boston, to establish such an art-educational institute as will cultivate, in a high degree, the national taste, and bring to life and light that dormant individual genius, which is but too apt to die unnoticed and unknown, where the necessary mental food is not within reach, and that modesty which seems to be an inherent characteristic of genius, shrinks from an appeal in its own behalf.

Already has Boston got a healthy working institute of Technology, with an admirable collection of architectural casts, and a professor well worthy of his charge. It is an example set to all of our cities that should be followed, and we

feel that it must be, at no distant day. One Institute is but a mite in the great contribution towards art-culture; the country demands a sufficient number to meet the wants of a growing intelligence. Paris is France, as London is England. But Boston is not the United States; neither is New York, Philadelphia, nor any other one city, however great. Art Institutes will be therefore wanted in all our States (at present in all those most advanced in civilization,) for, it would fall far short of the requirement of this country to compel the pilgrims of Art to seek one Mecca.

It is much easier to make a collection, or collections of paintings and sculpture on this continent than might be supposed, if we only take into consideration the great number of such works (at least of the former) which must exist here in a scattered state, and which, like that of the late Mr. Thompson, will sooner or later, come under the hammer of fate, which the auctioneer brings so decidedly down upon their ownership.

Our native artists are improving and increasing, and their works will, by degrees, fill their State Art Institution, and give an impetus to the great national movement.

We will again quote from the writer in *Old and New*, already referred to, which expresses our sentiments in these words: "If we believe, as we profess to do, that the civilization of America is to be raised to a higher level than the civilization of any by-gone age, we shall best prove it by neglecting no effort to preserve and to better all the instruction which has come down to us from the past, and to use it as a leaven with which to enlighten the heavy and gross materialism which has become our distinguishing trait among the nations of the earth."

In this connection, we take up the Annual Report of the Committee on Education of the American Institute of Architects, which having under consideration "the proper ends to be sought for, and the processes by which they should

be attained," say that; "the project of establishing a Grand Central School of Architecture, which should educate the entire youth of the country, is desirable but impracticable. The whole tendency of the social condition of the country is to foster the development of local centres of education, and the prejudices inevitable to locality, are difficult to overcome."

They recommend "to organize local schools; not of Architecture alone, but schools of Technology, wherein all the allied arts and sciences shall be taught. Colleges so established would have primarily the advantage of local patronage from the art public, as well as from the students within a considerable radius. The success of the institution would be one of the honors to be born by the chosen city, and the public spirit of the community would see that, in the advantages offered, it should be surpassed by no other.

"The allied branches, which require so much preliminary study over the same ground, being able to occupy the same building, to work under the same management, and to be taught in great part by the same instructors, could well harmonize with a great economy in the sinews of war.

"To begin such a school in any city, would, of course, require, firstly, the agreement of the different societies of Architects, Civil Engineers, &c., as to their needs and wishes; and secondly, the awakening of a public and private interest therein. This done the scholars will gladly avail themselves of the privileges offered.

"In the local establishments, made after this skeleton outline, the resident practitioners of each art could be retained, as far as they were able, to deliver lectures on historical and general topics connected with the courses, and to lay before the classes, in lecture form, analytical discourses, with illustrations, of such works, on which they are engaged, as they may consider to be calculated to

convey instruction. Classes might be formed to visit buildings in progress, under the guidance of the Architect of the building; inspecting the works in all stages, from the earliest inception in the sketches, through the stages of the studies, the working drawings, and the specifications, and then, as the works take upon themselves a material form, through the shops and yards of the mechanics up to the final culmination in the completed building.

"When enough schools have been formed in various places, then there should be established visiting lectureships in the literary colleges through the country, the discourses so delivered being intended to direct the attention of the under-graduates to the methods of obtaining technic instruction. Your Committee may here state that some of the members have been addressed, on these subjects, by persons

connected with several institutions of learning.

"A desirable object would also be the establishment of a grand concourse, under the direction of a Committee of that Convention to be opened to all students of the Architectural course in each centre, or to such students as should have attained a certain grade of distinction in the competitive examinations of their own colleges. The chief prize to be attained in this concourse should be a sum at least sufficient to enable the victor to spend a year in Europe, as a student of the buildings and other art works of ancient and modern times."

Which shall be the first State to follow the example of Massachusetts and bring before their Legislature the necessity of general art education? We hope, for the honor of the old Keystone that she will not be the last.

PRISON CONSTRUCTION.

THE grand jury of New York, advised the sale of the well known City Prison, which, being built in the Egyptian style of Architecture, obtained the *sobriquet* of *The Tombs*, from its resemblance to the burying place of the Pharaohs. The want of a new prison in New York must be supplied, and it is not too soon to enter on the consideration of the most perfect construction of such a building.

"The Tombs," which is now condemned, was the most ill-advised structure that could be conceived for the purpose, whether as regarding location or design. Situated on low ground, in a neighborhood of misery, the sanitary requirements were almost completely lost sight of.

Undoubtedly the idea of the Architect was the form which gave actual as well as apparent strength, and this the Egyptian does in an eminent degree, from the very fact of the *batter* being an in-

herent feature of that style. But, at the same time that the Egyptian is desirable on this account, as a model for prison construction, it is objectionable in a sanitary point of view, inasmuch as the walls are not susceptible of those necessary openings which ventilation calls for, and which are, or ought to be, the great leading features of constructions intended for the safe keeping of human beings who, although criminal, should be the subject of our philanthropy.

That there is much difficulty to contend with in the designing of prisons admits of no doubt, and the chief of these is the means of perfect ventilation. Now, the sufficient perforation of the enclosing walls so as to admit the air horizontally, is prevented by the necessary security which the thickness of these walls give; and also by the close barring of such openings as are introduced. Added to such difficulties is the fact that city prisons soon after their completion

became surrounded with densely populated streets and lanes, with all their accompaniments of reeking filth and poisonous odors.

The main object then in prison construction is space—ample, liberal space. The next is elevation of site. And after these, all the other necessities of this most peculiar of structural compositions.

A sufficiently spacious site, enclosed with iron palisading of a height that would prevent its being easily surmounted, and, having *chevaux des frise* on the top, would not alone admit of horizontal ventilation, but would afford guards an ample opportunity of detecting any attempt at escape on the part of prisoners. Watch-towers could be located at convenient distances, commanding each front, and a wide moat or ditch, at a distance of ten feet, on the outside of the palisading, would cut off communication with the outside world. This moat might be either dry, or filled with water. If dry it would be advisable to have the centre of the bottom staked, or furnished with *chevaux des frise*. If filled with water it would be well that a slight fall would give a current to it, so as to effectually prevent stagnation.

No underground dungeons should be permitted on any account. It is far more humane, and just as secure to confine certain prisoners in the centre of the building, where they are especially under the *surveillance* of the keepers. To carry this idea out to its full intent, it would be most desirable, where attainable, to have an island devoted to such purpose, and it is in lieu of such a location that we propose the moat or ditch. New York, Philadelphia, and Boston, possess admirable advantages in this way, and it is not a little surprising that the islands so convenient to these cities are not made available for that purpose. It is true New York uses Blackwell's Island, but it is also true that the city prison, so aptly called, the *Tombs*, has been permitted to exist, and enclose its victims, until disease has seized upon

their spring of life, and left its indelible mark on perchance an innocent member of a community, boasting of its prominent position in a century of indubitable civilization.

In prison construction, it might be well to avoid having cells on the ground floor, and, instead, to devote that story to the various official departments of the prison, confining the prisoners to the upper stories. In this way, the often adopted mode of escape through the floor, by means of sewers, etc., would be most effectually cut off. It is idle at this day, with all the experience of almost miraculous escapes on the part of hardy, daring and ingenious malfactors, to dream of laying down any floor that cannot be pierced by indefatigable perseverance, impelled by the dread of infamous death or the desire of cherished liberty.

That security of construction which is so studied by the architects of prisons, is too surely conducive of suffering and premature death to those whom the law has not designed to more than temporarily punish, with the view to an improved life when liberated. The pound of flesh, without the addition of one drop of blood, was all that the law allowed to Shylock. What more than simple confinement, without one day's curtailment of natural existence, does the law demand as the penalty of those transgressions which do not call for death? Why then should the prison, in which the requirements, the exact requirements of the law, and no more, are to be carried out, be designed without a full consideration of the preservation of health as a first object, and security unblemished by the infringement of the first, be the secondary thought? The law is accountable to society for the prisoner's life, while it punishes him for crime committed; and, furthermore, the law should strive to morally influence a criminal's remaining life of freedom, rather than by ill-judged means of confinement to shorten it.

There are many well constructed prisons throughout the country, built on the principle of security first, and health afterwards. It would, we fear, look invidious in us to name any as superior in plan. Our professional brethren, governed as they are by the requirements of absolute security, cannot deviate from the well used examples of thick, high, blank exterior walls, and of narrow closely grated windows, or loop-holes, through which light, air and

life, might manage to enter, were it not for the fear that one poor unfortunate erring mortal might escape from the slow but sure consumption of his existence.

Is New York going to break through the trammels of barbarous custom, and establish a humanitarian system of prison construction; or, is that great city about to repeat the cruelty of the past by the re-erection of a bastille, such as she now proposes to demolish?

MIRACULOUS BUILDING.

IT is a difficult matter in this enlightened age to induce people to believe in the working of miracles; we are grown wise beyond that point, and cannot afford a single thought to such a profitless subject. But, with all our assumed sense, and manly independence of thought, founded on incontrovertible reasoning, how ignorant are we of the fearful fact that we live miraculously, among hundreds of miracles. In proof of this bold assertion, we need but ask our readers to take a moment's notice of the manner, in which the walls of the dwellings, to whose protection human life is fearlessly committed are built.

The acrobat who balances several clay pipes, perpendicularly, one upon another, is not more successful in his cunning trick, than is the bricklayer who rears thirty feet of eight inch walling with numerous tiny blocks of baked clay, flimsily held together with splotches of half-mixed ill-proportioned ingredients of lime and sand, called "mortar." How much more wonderful is the act of the juggler, called a mason, when we take into consideration the vastness of the effort of this rearer of clay cubes, in proportion to that of the balancer of clay-pipes. In fact, the accomplished feat of the piler of bricks, is a veritable miracle in itself. But, sometimes these miracles will fail; and indeed it may be

considered one of the most miraculous things, that they do not oftener fail to maintain their perpendicular, seeing what a pressure of flooring and roofing, they have to sustain, not to speak of the springing, jarring and straining they are constantly subjected to in the locomotion, quick or slow, light or heavy, of the living freight on each and every floor.

Were we, of these Eastern States, liable to shocks of earthquake, how diminished in street expanse, our cities would be in the event of a shake. Even when rude boreas gives us a moderate blast, how tremulous is the condition of our uniform files of brick construction.

Almost every mail brings us the tidings of the disastrous results of defective construction in the erection of buildings. St. Louis recently contributed a notable accident, and we have late advices that the Young Men's Christian Association of Chicago, has finally been mulcted in the sum of \$4,300, for damages done to the adjoining building of a Mr. Rne, by the falling of the wall of their building, which burned two years ago. This case, which has been in the courts for some time, was recently decided as above by the United States Circuit Court at Chicago. It appeared in evidence that the walls of the building, one hundred feet in height, were of the thickness of only twenty inches; that the east wall was

partially built of concrete blocks; that the walls were for the most part erected during the winter, when they were alternately frozen and thawed; that after the first floor and basement were leased to Messrs. Underwood & Co., the floors began to settle under the weight of their merchandise, and additional supports were found necessary; that the east wall fell within fifteen minutes after the fire broke out; and that there were in various places as many as fifteen courses of brick without a heading course

The Court, in the delivery of its opinion, gave the following instructive statement:

"It was the duty of the defendant, in constructing its building, to make the walls of proper thickness and of proper materials, properly put together, to accomplish the purpose they had in view in the erection of the structure built. But the defendant was not required to construct a wall to withstand the operation of all extraordinary causes that might be brought against it to impair or to destroy it, but only for the purpose of withstanding those ordinary causes which might operate against it, having in view the purpose and character of the building itself. As to negligence, the question was, whether there was a negligent construction, under the law. The negligence, in this case, would be that the building was constructed (to accomplish its purpose) in such a way as a reasonable and prudent man would and ought not to construct it; negligence being the doing of something which a reasonable man would not do, or the omitting to do something which a reasonable man would not omit to do. The Court, however, could not say, as a matter of law, that a person constructing a building was bound to construct it in such a way that the walls would not fall when a fire should occur. All he could say was that, as a matter of law, a person constructing a building is bound to construct it as a prudent and reasonable man would construct it, with reference to the character and object of

the building under the circumstance connected with it."

If then the annihilation of the flooring and roofing timbers endangers the stability of the walls, is it not evident that such walls are insufficient to the work of support; and that they should either be built of the requisite strength, or the beams should be of iron instead of timber.

But, it is not to the skeleton thinness of the walls that the objection is confined; it is quite as much to the imperfect way in which the bricks are connected. The fact is well understood that masons, being desirous of hurrying their work, so that as many thousand may be laid in a day as possible, the consequence of such haste being that *stiff mortar* is out of the question, and that the very plastic stuff used, becomes with the thirty per centum of water out of it when dry, very friable and porous, making the brickwork anything but the solid mass it should be. But, there is another bad feature in our every day brickwork, as applied to the dwellings of the great majority of the community, and that is the wide separation of the bond-courses from each other. Now, if there is any advantage whatever in this bonding system, it is surely much more called for in an eight inch than in a twelve inch wall; yet, strange to say, our miraculous house-builders will persist in giving fewer bond-courses to the former than to the latter. It is time that the law should be brought to bear upon this subject oftener than it is; and that it should not be left to the self-preserving efforts of insurance companies to vindicate the right of the community to as perfect freedom from accidental life-taking as possible. Throughout this extensive country, there are but two or three cities which have Building Inspectors to enforce the proper construction of dwellings and other erections, and although accidents from wilful neglect are not unfrequent in cities not so protected, with what perfect impunity does the perpetrator of the work, which has proved

fatal, escape the well merited chastisement of the law. If the community in general were only aware of the perpetual danger in which they live, while occupying such structures, what an outcry would be raised against them. All are made aware how "shaky" those brick walls are, but few realize the fact of their possible "shake down."

Let us suppose the climate to change materially, and become like that of Great Britain, and that some of those often occurring storms, which we would call "violent hurricanes" should visit us, what would become of our numerous streets of fair looking brick houses?

How long are these miraculous buildings to be tolerated?

OSMOTIC ACTION.

IT is a source of wonderment to many persons why the well built stone-walls of houses are so damp as to require firing for the plastering of them, no matter what the thickness of these walls may be. Such walls are built of lime-stone, one peculiarity of which material is, that while it absorbs moisture on the outside from the atmosphere, it gives out that which it has absorbed, in compliance with the law of *osmos*, through the action of heat in the interior of the house, and the thickness of the wall does not in the least prevent the intrusion of the damp. The very action of artificial heat upon lime-stone in the kiln will prove this; for then the moisture it had previously acquired by exposure to the atmosphere is drawn forth, and its acquisitive properties becomes still more developed; that is, it becomes thirsty, as it were.

The increasing of heat in the rooms of a house, the walls of which are built of lime-stone, instead of drying them during rainy weather, actually has the opposite effect, for the *osmos* is superinduced by the attraction of the heat thus created, and the thin surface of fine rain water, percolating through the stone, becomes thicker, and establishes itself in large globules on the plastering of the inside face of the wall; which globules, bursting from accumulation of water, course downward, and keep the whole surface of such wall in a state conducive to ruin of the building, and the ill health of its inmates.

To remedy this destructive influence of osmotic action on lime-stone, it is a very common practice to stud the walls and lath on to that studding. But, will it not at once appear evident to a thinking mind that the mischief maker is only hidden, not killed? Is not the influence still at work rotting the studs, and generating the most baleful agency of disease in the space between the plaster and the wall; which noxious humid creation is too surely drawn through the pores of the plaster, by the attractions of *osmos*?

No, this firing or studding, or boarding (called sheeting), is as unwise an expedient as it is ultimately a useless one. The only certain remedy is to make the outside face of the wall perfectly water-proof; and, even then, although osmotic action be effectually prevented, the other great enemy of lime-stone, capillary attraction has to be guarded against, or the damp from the ground will be sure to insinuate itself up into the warm rooms, *via*, the heart of the lime-stone wall, thus circumventing the external water-proofing process. So that it is just as necessary to have a water-proof course between the foundations and the superstructure, or the evil influence of the capillary attraction will prove fully as detrimental as the osmotic action which has so frequently rendered good houses untenable.

Brick, although as absorbent as lime-stone, is not as liable to *osmos*, for the simple reason that the one is of a heat-

ing nature under the influence of moisture, while the other is cooling, and the absorbent action of the sun quickly draws out again the damp from the brick, while with the lime-stone the internal heat attracts it through the wall, and the sun's influence only makes it

more absorbent and prepares it the more effectually, for the next supply of rain.

This is a very interesting subject, and one in which so many are interested that we shall be most happy to hear from our friends who will contribute information towards its development.

WEST PHILADELPHIA IMPROVEMENTS.

THE immense strides in prosperity and increase of population, so faintly foreshadowed in our August number of 1868, as the future prospects of West Philadelphia, have so far surpassed in reality our wildest dreams, that we, as faithful chroniclers of architectural advancement and progressive building, can remain silent no longer. Many very handsome improvements have been made in various sections of that locality during the last five years; but that of the greatest magnitude has been projected and accomplished by one builder, all within the eighteen months past, embracing the erection of 138 large dwellings,—the 76 brown stone houses on Sansom street, between Thirty-second and Thirty-third streets, started in August 1868, and finished by April 1869, are now all occupied; also the 29 large houses on Thirty-fourth, Chestnut and Woodland streets; and latterly the completion of thirty-three white marble houses of the largest size on Chestnut street, extending from Thirty-second to Thirty-third streets, only commenced in May 1869,—certainly an achievement of which any man may well be proud, and worthy of the progressive age in which we live.

These marble houses are all four stories high, front and rear, with marble fronts to the cornice, surmounted with French roofs of a most beautiful design; terminated with iron crestings. The main front of each separate house is 32 feet in

depth, with rear buildings 48 feet deep, and they are, of course, all built in the latest improved style, with large bay windows to dining and sitting-rooms. The interior fittings throughout, are of elegant design, and workmanship to correspond.

No one but a builder can realize the vast magnitude of this enterprise. When it was started last June, we were among the skeptical, and refused to believe that the builder could possibly get the marble fronts up during the year 1869. He himself, however, was sanguine of success and pushed ahead with remarkable activity. The contract for the marble work was given to Mr. John S. Malloch, of this city. June 1, 1869, he commenced to set the fronts, and on November 4, 1869, they were up. January 1, 1870, one house was completely finished, and shortly after occupied.

The appearance of that solid row of white marble dwellings, 606 feet in length, in perfect symmetry and proportion, is imposing and grand, and challenges the admiration of every beholder—a pile of marble palaces—it is a glory to our fair city, and a monument to the fame of the builder. It will always hereafter be a landmark, and is the farthest advance yet made in this city in domestic architecture upon so extended a scale.

It seems, indeed as if we lived in a land of enchantment; what was only a few months ago fields and vacant ground, is now occupied by stately mansions, peopled with a social class of our best citizens,

bringing wealth, population and financial prosperity to this rapidly improving section of our beautiful city.

In conclusion we would mention the great business interests centering in West Philadelphia. The railroads of this State must all eventually terminate there, and warehouses and grain depots are being rapidly constructed, for present and prospective business accommodations, one of which lately erected by the Pennsylvania Railroad, is of sufficient interest to minutely describe. It is of gigantic proportions being 555 feet in length, 125 feet in width and 36 feet from ground line to eaves, it is divided into two stories by a floor 19 feet above the ground line. The roof is a single span having a one-quarter pitch, and built of wrought-iron, upon the simple triangular truss system, with timber principal rafters. It is covered with slate, and has at frequent intervals, sky-lights of hammered glass. The balance of the building is constructed entirely of timber, the sides being sheeted and slated. The total contents, comprised within the outside walls and from ground line to slope of roof, is 3,607,500 cubic feet. The cars enter the second story by six tracks running its entire length. Between the tracks the platforms are 4 feet above the rail. Underneath, from the platforms down to eight feet above the lower floor or ground line, the whole of the space is put into bins. From the cars the grain is shovelled directly into upper openings in the bins, which are 11 feet apart on either side of each track. There is a sliding valve in each bin at the bottom, by which the grain can be passed directly into wagons underneath by its own gravity, the sides of the bins being sloped at such an angle as will insure its delivery. The total number of bins in the building is 600, and the average capacity of each 500 bushels, giving a total capacity of 300,000 bushels. By a system of duplicate numbers on the upper and lower openings of bins, the grain of different shippers can be kept

separate and distinct, and is transferred from car to wagon without confusion. Wagons enter the ground floor by 50 passage ways running in the direction of the width of the building, and separated by trussels eleven feet apart, which support the upper floor. These passage ways are directly under the lower openings of the bins, and are closed by doors at each end. On the platforms between the tracks on second floor, flour in barrels may be unloaded, and at the east end of the building, on the outside, a block and tackle is arranged for each platform to facilitate lowering the flour to a wharf beneath.

The plans and specifications for the building were furnished complete by the Construction Department of the Pennsylvania Railroad, and the work executed under its superintendence, although the most of it was done by contract.

THE RANSOME PROCESS.

ALMOST every one is familiar with the ordinary process by which Mr. Frederick Ransome manufactures artificial stone, and knows how the sand mixed with silicate of soda is treated; then with chloride of calcium, with the result of their mutual decomposition and reformation as silicate of lime and chloride of sodium, the former living as an indestructible bond throughout the stone, the latter soluble and easily removed. The sand, after being dried, is worked up in a mill with the soluble silicate brewed from caustic soda and flints, the latter being dissolved by the former, and evaporated down to a specific gravity of 1.700. The plastic mass thus produced is obedient to the will of the molder, and can be manipulated into any form, from a cube to elaborate screens, such as those decorating the India Office; from a grindstone to an exquisitely chiselled fountain, like that recently erected in the public gardens at Hong Kong. The mass so prepared is then saturated with chloride of calcium

applied either simply by immersion, or assisted by the action of an air pump, in either process the solution being gradually heated to a temperature of 212 deg. Fahr. Mr. Ransome has recently made some further important improvements, which promise great results.

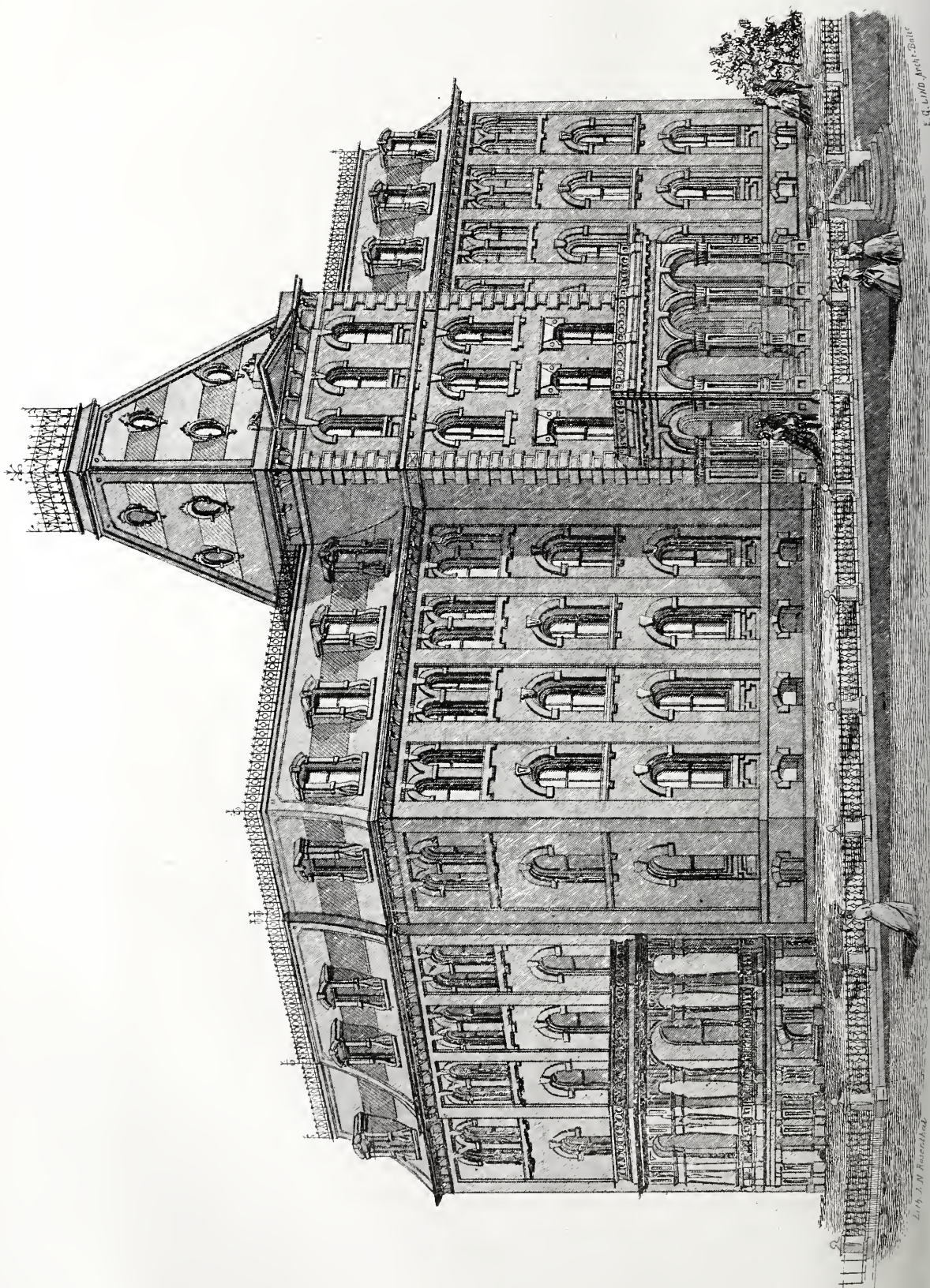
These consist, first, in submitting the molded mass to the indurating action of the chloride solution at a higher temperature in closed chambers connected with a steam boiler. When this has been carried on for a sufficient length of time, by opening a cock, the solution is forced by steam pressure into a separate chamber, leaving the stone to cool gradually in partial vacuo, by which all dangers of cracking is avoided—a casualty which is liable to happen when large masses are exposed to rapid extremes of temperature in the open air.

The next feature in these improvements lies in the ingenious method adopted by the inventor for extracting the soluble salts of calcium and sodium from the body of the stone, which is effected in the same closed chamber by the admission of steam (or steam and water alternately), which, as it condenses and becomes saturated with the salts referred to, is returned into the boiler, where the steam is generated, and the chloride of calcium is again made available for future operations, thus obviating the serious loss incurred by washing the stone in the way hitherto adopted.

It is gratifying to learn that the manufacture of this stone is being adopted even in most distant parts of the globe. We have already, in previous notices, informed our readers that manufactories have been established for its production in India, America, Australia, Belgium, Denmark, and Sweden. But little actual progress has, however, been made in the practical introduction of the Ransome process in the United States. It is true that the patent rights for that country were advantageously disposed of some years since, and that the

proprietor in America has made capital by the sale of licenses; but ignorance or indifference, on the part of the original purchaser, prevented his licensees from developing a large and most lucrative branch of industry. This being the case, it is satisfactory to find that one of the would-be manufacturers in the United States has taken the initiative, and is endeavoring to redeem the time lost and the capital expended in useless experiments. The proprietors of the patent right for the State of California have established large works in San Francisco, under the title of the Pacific Stone Company, for the production of artificial stone, and, but for the slight drawback of being in ignorance of the practical details of the process, would probably have developed an extensive business. Being unable to obtain the necessary information from the American proprietor, and tired of working in the dark, they have at last adopted the most satisfactory and common-sense course of coming from California to Greenwich to learn the whole course of the manufacture at the fountain head. To this end the managing director, and principal shareholder in the Pacific Stone Company, Dr. W. May, has recently arrived from California, and is rapidly acquiring the mysteries of artificial stone manufacture from Mr. Frederick Ransome, by whom every facility is offered for the benefit of American licensees. We mention this because it is a matter much to be regretted that for so long a time the vastly important Ransome process should have remained almost a dead letter in the States, so far as real utility is concerned; the American proprietor having apparently devoted his attention to making money rather than stone, from his purchased patent right. This is, of course, at an end now, and the manufacture under this patent in America will be so much greater than it is in England as the demand for the production is proportionately increased.—*Engineering.*





THE LOUISE HOME, WASHINGTON, D. C.

Arch. J. W. Russell

THE LOUISE HOME—AN ASYLUM FOR AGED WOMEN,

WASHINGTON, D. C.

THERE are many advantages which great wealth confers upon its possessors; but none at all compare with the heavenly privilege of extended charity, the aiding and alleviating the sufferings of fellow beings; and when this ability is exercised in connection with that of being able to pay the full tribute of the heart to the memory of those to whom we bear an undying kindred love; then, indeed, is wealth inestimable as a special means of attaining all that man on earth can wish for.

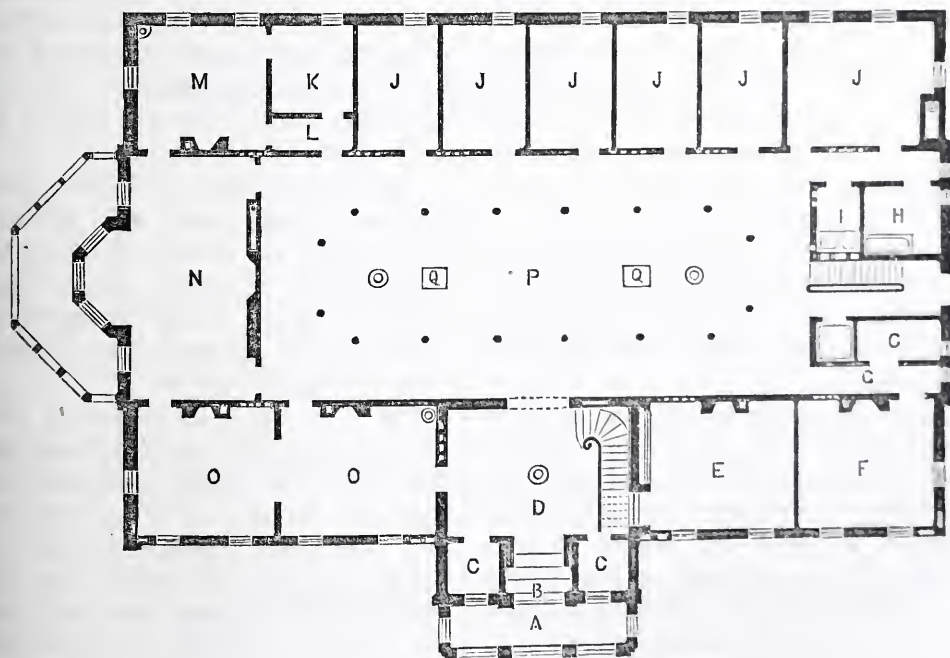
This illustration presents the design of the LOUISE HOME, now in course of erection at Washington. It is intended

to accommodate over fifty inmates; it measures in front, one hundred feet, and is sixty-four feet in depth, giving ample room for all the necessary apartments, offices, etc.

The design is that of Mr. E. G. LIND, Architect, Baltimore, Md.

The plans show the arrangement of the building, with the disposition of its rooms, offices, etc.

A, the Portico to front entrance, with steps, blockings, pedestals, columns, pilasters, arches, cornices and balustrades of best quality Seneca stone, laid on its natural beds, in as large stones as possible, and properly cramped and dowelled.



FIRST FLOOR.

as an asylum for aged women, and is at the same time a tribute to the memory of a much loved daughter, by W. W. CORCORAN, Esq., the well known banker of Washington. The name of it is that of the deceased young lady. It is arranged

The ceiling is formed to suit the openings, with styles or beams of deep stones of the same width as columns, and covered with eightinch slabs, having sunk panels carefully joined and dowelled, and made perfectly water tight. The floor of this

portico is paved diagonally with slabs of German stone, furnished by Mr. Corcoran.

B, Vestibule, with steps leading to hall. C, C, C, Closets. D, Hall, with staircase. E, Inmates Parlor, with cabinet. F, Double chamber. G, Passage. H, Bath-room. I, Water-closet. J, J, J, J, J, J, Apartments of Inmates. K, Matron's Bed-room. L, Passage. M, Matron's Parlor. N, Day-room, with bay window. O, O, Committee parlors, connected by folding doors. P, Open Court, with iron columns supporting the gallery on second story, on which the upper chambers open.

The spaces between joists of first story, are filled in with rough boarding, on proper fillets prepared in the usual manner for counter-ceiling and tiling.

The joists of the basement floor are $7 \times 27\frac{1}{2}$ inches, and all other floors, $10 \times 27\frac{1}{2}$ inches. Those in the court, on the first story, rest on 8×10 girders, supported by the iron columns here shown. The joists in vestibule and hall of the ground floor are set $1\frac{1}{2}$ inches lower than the rest, for the purpose of receiving the marble tiling.

All the external brick walls in the basement are battened out with one by two inch strips, nailed to bond timber sixteen inches from centre to centre, for lathing.

The floors throughout are laid with inch and a half, grooved and tongued North Carolina yellow pine boards, select quality, thoroughly seasoned, secret-nailed to joists, and dressed off after laying. The skirtings, or wash-boards throughout, are well seasoned white pine, one inch thick, and six inches in height, surmounted by a two inch molding, and having a one inch base molding nailed to the flooring, to guard against shrinkage.

The front and side entrance doors, as well as the vestibule, are of well seasoned walnut, panelled and worked with bold moldings, and hung to three inch panelled and molded walnut frames, with

ornamental bronze hinges, and furnished with the best mortice locks and latches, and and to correspond, bronze furniture.

The walls and ceiling of vestibule are lined with one and a quarter inch walnut styles, and half inch oak panels, molded and wrought to correspond with the doors.

The centre of the ceiling is fitted with ornamental carved boss, perforated for gas-pipe, and a four inch molded cornice runs around wall and ceiling. The windows, including the dormers, have ovolo sashes, inch and three-quarters thick, double-hung. The small windows in tower roof have inch and a half ovolo sashes, made to hang on pivots in molded frames, fitted with water-bars and inside fastenings complete.

A sky-light over the centre of the court gives light to it and the surrounding gallery. It has a molded cornice projecting twelve inches all around, and has pivotted slat ventilators under the same, fitted with cords and pulleys for opening and closing the same.

All the windows throughout have inch and a half pine inside shutters, hung folding on jambs. Those in the basement are to have panelled and molded shutters, similar to the doors. All above the basement have pivotted slats of varnished walnut.

The principal stairs (shown in hall) have inch and a half molded treads and inch risers, with an inch and three-quarters close string; all of well-seasoned ash. The string has a molded capping, panel and bead of walnut, two inch turned balusters of ash; four and a half by three and a half inch walnut handrail, running into molded and panelled newel-posts, nine inches square, with ornamental finials and pediments thereto, and finishing ten inches, with ash moldings and trimmings. The other staircases have inch and a half molded and returned treads, with inch risers of ash and continuous handrail, four by three inches, terminating against a turned

newel of walnut, and having balusters of oak.

An elevator, or lift is fitted up with all necessary tackle and apparatus for use, boxed and enclosed.

A Refrigerator (Schooley & Winshop's), duly ventilated and finished, is also fitted up.

Dresser and cupboard, with drawers, shelves, and closets complete, are fitted up in the Kitchen.

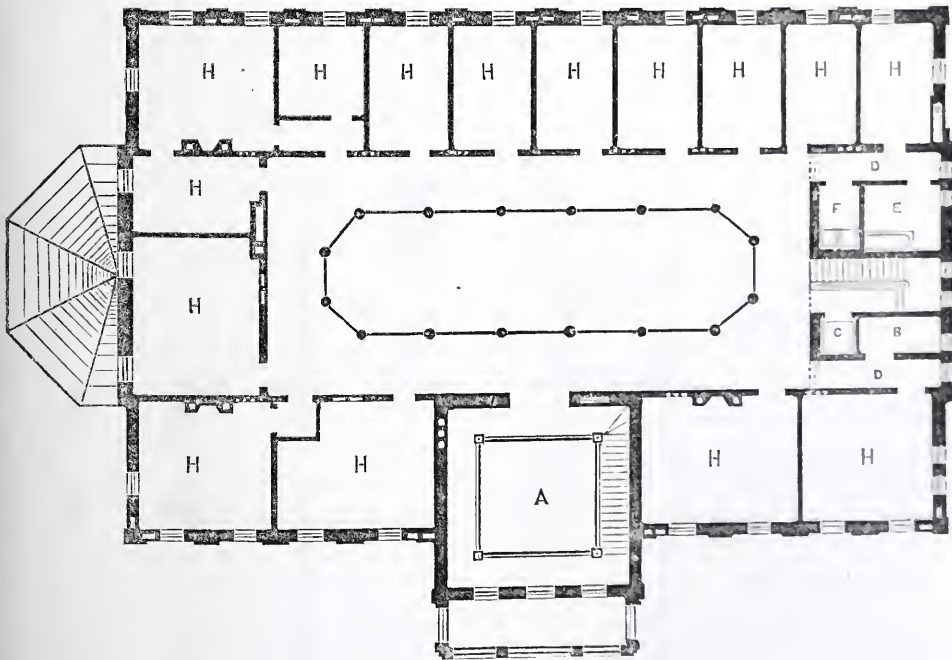
A cistern of two thousand gallons capacity is fitted up in the fourth story, immediately over the Bath-room, etc., lined with lead (seven pounds to the foot superficial), and with this all the necessary connections are formed with the water fixtures throughout. This cistern is supplied by a double action Farnham pump of brass, with large fly wheel, and all the necessary connections.

The Laundry is fitted up with perma-

nent wash-tubs of inch galvanized iron, having hot and cold water supplies. The Drying-room is completely fitted with drying horses, with all necessary steam pipes and flues connected with the heating apparatus.

A furnace is provided in the basement, with an approved steam heating apparatus, of sufficient capacity to properly heat and ventilate the whole building, including the basement with all requisite flues, pipes, top and bottom, registers and radiators. A Range of the first class English Kitchen model, of approved manufacture, and sufficient capacity to cook and bake for one hundred and fifty persons, is provided and set up in the kitchen.

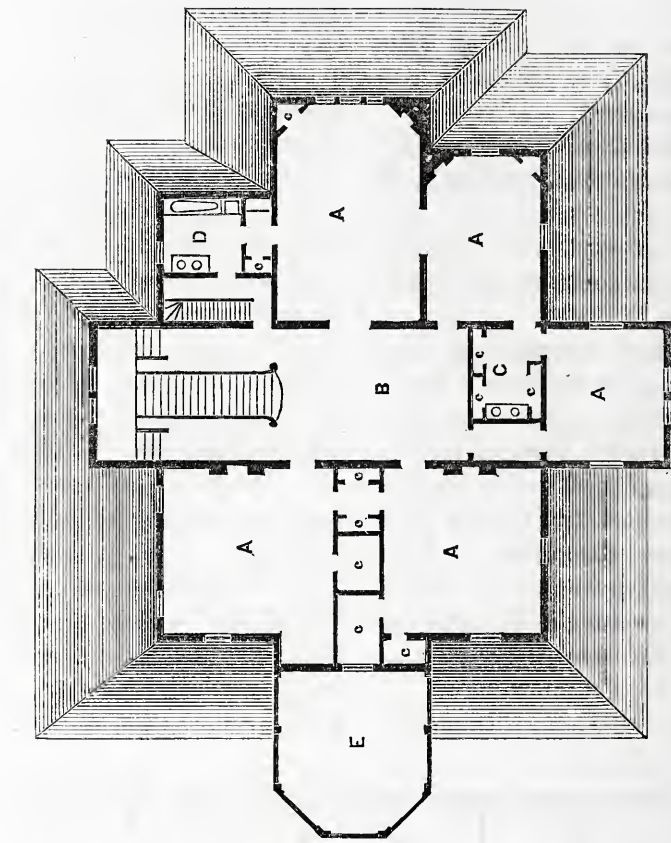
A two hundred and fifty gallon iron boiler, set on strong bearers, is also furnished for the kitchen, complete in every particular, including water back boiler connections, ventilating flues, etc.



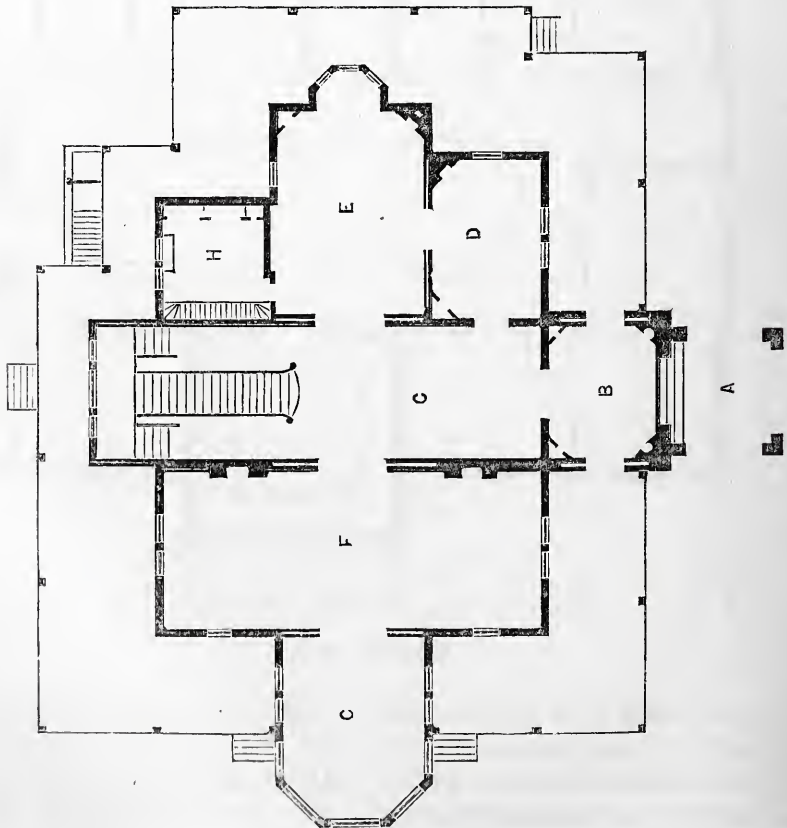
SECOND FLOOR.

The second story is, as shown in this plan, cut up into numerous apartments. The hall with its open staircase, the gallery leading to all the apartments on this floor.

The contract for the "Louisa Home," all completed in itself, amounted to \$180,000. The fencing, grading, etc., will add \$10,000 more to that amount.



SECOND FLOOR.



FIRST FLOOR.

SUBURBAN VILLA.

CARL PFEIFFER, ARCHITECT, N. Y.

THIS very unique composition is constructed entirely of wood; and instead of being made an imitation of stone, as is so often the weak ambition of some, is exactly what it represents, namely: a framed house sheeted with ornamental vertical planking, with horizontal alternates; the studs displayed, and the planking appearing in panels.

In this composition may be discerned the appropriateness of its application to the chosen material. Its boldly projecting roof, with ornamental framed gables; its picturesque effect of independent tower, with pyramidal roof and shed-cornice, so perfectly in keeping with the Mansard roof of the house; and the gable ventilators, which so agreeably sustain the unity of the design.

A wide piazza surrounds the house. The first floor is entered from this piazza through the vestibule; or from the *porte cochère* in front of the tower. The side entrances to the vestibule are sliding-doors; and the four angles are cut off, and niches formed in them. From the vestibule the hall (16 feet wide) is entered; at the end of which is the main staircase, with double return flights. On the right of the hall is the Drawing-room, a splendid saloon, forty-six by twenty feet; off of which is the Billiard-room, admirably lighted by nine windows.

The Dining-room, on the left side of the hall, is *en suite* with the Drawing-room and Billiard-room, and, taking in the hall, will on an occasion afford ample accommodation for a festive reception. The rooms are well lighted and ventilated throughout, and the heating is properly provided for. In fine, this is a thoroughly comfortable house, possessing, also, all the pleasing effects of an artistic composition, without extraneous ornamentation or unnecessary outlay.

The basement of this suburban resi-

dence is apportioned off with much judgment, and it is made to add very materially to the economy of the house-keeping department.

The Kitchen is situated in the basement, directly under the Dining-room, having a capacious range, a convenient sink, a pantry, with dumb-waiters in it, two store-rooms, and a laundry in connection. The back stairs communicate with the Butler's Pantry. The Kitchen is well lighted. The cellar is so arranged as to give compactness and warmth where they are needed; also space and air where such are advantageous.

The areas around the Kitchen are sufficiently spacious to admit of light and ventilation, besides ensuring the dryness of the house. It is one of the most desirable features in any building, but especially in a dwelling-house, to have the basement walls perfectly clear of the earth, so that no damp can possibly insinuate itself through the walls, as is so frequently the case.

The following is the reference by letters to the plans:

A, *Porte Cochère*. B, Vestibule. C, Hall. D, Parlor. E, Dining-room. F, Drawing-room. G, Billiard-room. H, Butler's Pantry.

The second story is arranged as follows:

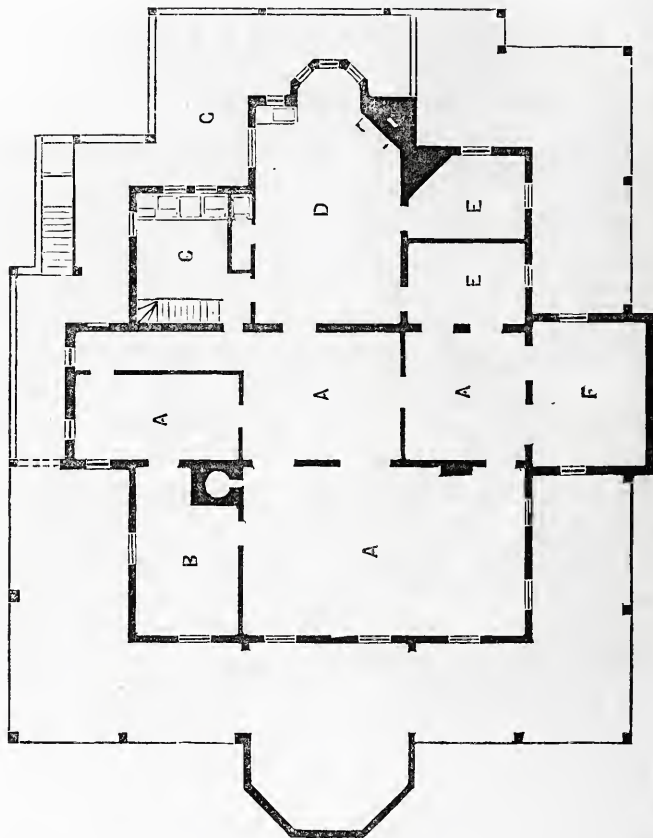
A, A, A, A, Bed-chambers. B, Hall. C, C, C, Dressing-rooms and ward robes. D, Bath-room and Water-closet. E, Balcony, over Billiard-room.

The following is the arrangement of the third story:

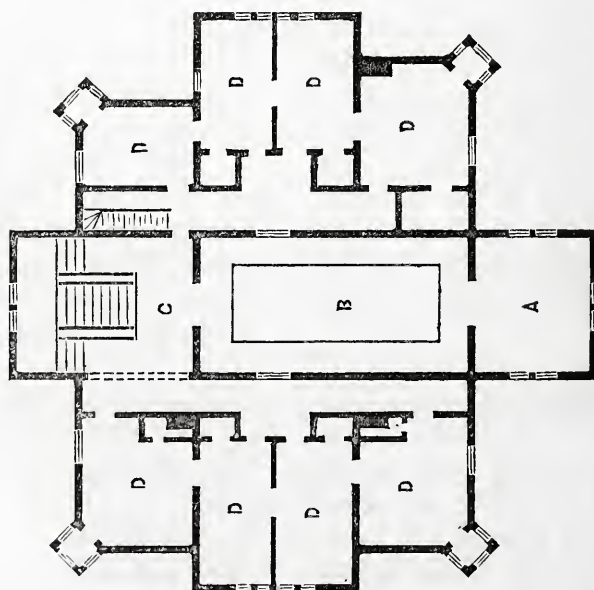
A, Tower-room. B, Picture Gallery. C, Hall and staircase. D, D, D, D, etc., Bed-rooms with closets.

The Basement is thus described:

A, A, A, A, Cellars. B, Coal cellar. C, Laundry, with wash-trays, etc. D, Kitchen. E, E, Store-room. F, Vegetable cellar. G, Area.



BASEMENT.



THIRD FLOOR.



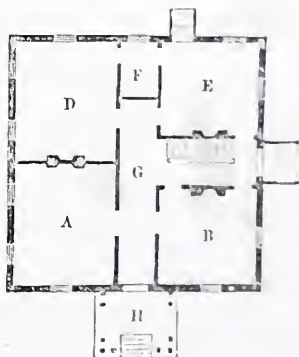
ECONOMIC COTTAGE BUILDING.

THE popularity of cheap modes of house construction must always be very great, for the simple reason that men of humble means, no matter how small that means may be, possess nevertheless a laudable ambition to become house-holders. Is it to be wondered at then, that every hint thrown out on this, to them, most interesting subject, should be caught up, and still more sought for?

In view of the great extent of wooded land throughout our vast country, we consider that lumber is the material which calls for our first attention in reviewing this very interesting subject; and we, therefore, proceed to treat of the most economic methods in use for the construction of houses of suitable capacity for the great mass of persons in quest of such knowledge.

The cottage Orné presented above is to be taken as an exponent of that middle class of country houses, occupying a position between the cottage villa, and the simple unadorned cottage dwelling. Its plan is convenient and comfortable, and will prove desirable whether built

in one or two stories, or story and a half. The description is as follows:



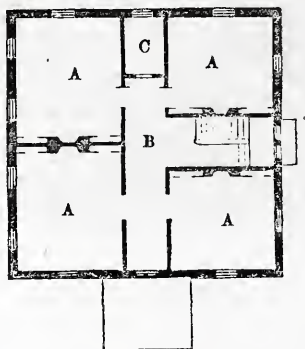
A, Parlor. B, Bed-room. D, Dining-room. E, Kitchen. F, Closet. G, Hall. H, Portico.

In case this plan be carried out as a one story and a half cottage, the stairs may be made one flight, and the room thus gained be added to the kitchen. The roof, if Mansard, would add four chambers to the house, but little smaller than those on the first floor.

A gable-roof would not look well, on account of the squareness of the plan,

unless the centre of the gable were to be set forward one-third, and the side of the roof over the rear part, sloped with a gentle curve towards the end wall, so as to leave the kitchen and dining-room, but one story.

Supposing the proposed cottage to be but one story; then the space otherwise devoted to the stairs, would be available for a small bed-room, or two large closets. But, if the two story plan is to be carried into effect, the second floor may be as here given:



A, A, A, A, are four Bed-chambers, having clothes-presses at either side of the fire-place, in each. B, Hall. C, Closet.

A water-closet might easily be placed at the head of the stairs, where the baluster returns to the wall.

In the perspective given above, the dimensions are increased; that of the front being elongated so as to render its roof more agreeable to the requirements of the gable form; and, as the height will admit of it, two attic rooms are added to the accommodation of the house.

This makes a very comfortable and pleasant looking farm house. A cellar basement may be constructed under the whole; or one half, as deemed advisable.

MODE OF CONSTRUCTION.

With regard to economy in buildings of wood, it is cheapest to adopt the balloon style, which we now describe.

The Basement (of stone or brick) being complete, a framed sill of dimensions

appropriate to the size of the house, is to be laid down, halved, and pinned together at the angles in an accurate manner so as to hold it firmly. Across from front to rear, under the location of the parallel partitions of the hall, two tie-beams are tongued into front and rear sills, and secured with oak pins. A tie-beam is also set in from side to side. The flooring joists are now laid down on the sills in which-ever direction is most convenient. The ends of the joists should be sawed off square and perfectly flush with the outside face of the sills.

The cap should now be framed, and securely pinned together at angles; its four outside surfaces being on the same plan with those of the sill over which it is to rest. Six inches by four is ample scantling for the purpose.

When framed completely, the cap is to be carefully raised to its proper height and position, and two upright boards (the proper length), stoutly nailed on at both ends; viz, to the sill at the bottom and the cap at the top. This done the whole house may be enclosed with rough boarding (hemlock, if cheap), without reference to the openings for windows and doors, which may be sawed out afterwards.

We will here say that there is another method of erecting such walls; which is to nail each of the four sides to the capping pieces, horizontally, on the ground, and then raise them into position,—sides first, and next the ends; and by halving, fitting, and pinning down the caps of the ends on those of the sides, thus secure all; observing not to nail the vertical boards of the ends to the sills until the capping is perfected above.

Where openings for windows and door-frames are to be cut out, binding pieces should be nailed on across the boards to secure them in their places; and when the frames are in their position the outside covering is to be put on. The boards composing this siding or covering are to be mill-dressed on the outside, tongued, grooved and nailed up

vertically over the rough sheeting already spoken of. Over the joints are to be nailed slats inch thick and two inches wide, having the edges bevelled off.

The plinth, one inch thick, being nailed on this dressed siding, will come exactly flush with the outside surface of the slats. Its upper edge should be bevelled to coincide with the bevelled edges of the slats.

A fascia similar to the plinth, only wider (to suit the design), should be nailed on the tops of the vertical boards, and on this the brackets are to be spiked, observing to have them come above a slat in every case, if at all possible; for, system, in this seemingly trifling matter, tells to great advantage.

Inside slats or furring slips, should be nailed over the joints of the vertical boarding, and the lathing for the plastering should come on these; unless indeed, it would not be deemed too expensive to have recourse to diagonal furring over the first furring, and then lathing on it. For great strength and least liability to cracking of the plastering, we would strongly recommend this practice.

The roof should be so constructed as to give the least possible pressure on the walls, and to give a weather to the same of not less than two feet. But, this latter will be governed, of course, by the requirements of the design.

If the Gothic gables are used (as in this design), it will be necessary to continue the vertical siding up in accordance with the pitch. In such case, the first pair of rafters at each gable will be secured to the siding, by having the latter nailed to them; and a ridge, or pole-plate, made to extend beyond each gable, and be halved down on them; the adjoined rafters, just spoken of, being cut out so as to abut against, and be spiked to the ridge, or pole-plate.

The extensions of these rafters are frequently made use of as ornaments in the bracket form; in which case, pieces are nailed on at the soffits of the

gables to assimilate with the actual rafters at the side eaves. The vertical brackets can be used as supporters to these; and, with the edges of the rafters bevelled off on the front and sides, a very neat effect can be produced.

A bed-molding is required at the joint where the roof meets the wall, to prevent the intrusion of the weather.

Where a second floor is required in this balloon construction, it is desirable to make the joist as secure as possible; and this is best effected in the following manner: Where the joists run parallel with the side or front, spike the adjoining joists and siding well together through an inch belt-course applied to the outside. Spike on a straight piece of scantling to the inside of the walls, at right-angles with this, and cut the ends of the joists, so as to have them halved down on this piece of scantling. Nail them stoutly in place; and continue the belt-course around, spiking it firmly to the ends of the rafters.

Although it has no framing timbers in its construction, this balloon method of building is really stronger than the frame mode. It is a perfect compact box; and, if built in a thoroughly workmanlike manner, will make as comfortable a house as any other.

There is another method of constructing wooden houses, which, if lumber be not dear, makes a very desirable and warm dwelling. It is, to form the walls of plank in four inch breadths, laid flat, projecting each course alternately on either side, and securing the whole together by means of oak pins. The frames of windows and doors may be inserted directly in the opening cut for that purpose; or, they may be nailed to side pieces inserted and secured between them and the blank ends.

The roof of such a construction is in no way different from that applied to any other mode of building.

The plank-on-flat walls require no lathing as the alternately projecting courses answer the purpose of laths.

The outside may be plastered and rough-cast; or, siding, such as clapboards, may be had recourse to. In this latter case it would be as well to have the surface even; and in doing so, only every alternate course of plank on the inside is to project; to accomplish this object it would be necessary to have the planks in two widths, four and five inches, or four and three alternately. This, however, incurs an avoidable expense, and as our present suggestions are strictly economical, we cannot recommend it.

There is one serious objection to this plank-on-flat method of building, but it is one that may be guarded against in the commencement; it is the liability to rot, being generated by the contiguity of diseased "stuff," or the presence of sap, which will work destructively where the atmosphere has no access to its locality. As a preventive we would urge the bedding of the plank, before being used, in quicklime for forty-eight hours. In that time the sap, or other concealed moisture, will be drawn out by the caloric action thus generated, and the tissues will be made tougher.

In proof of the drying and hardening property of the lime, it is only necessary to call attention to the state of the boards of a lime or mortar floor, when taken up after use. They are perfectly indurated, and as lasting as stone itself.

Of course, the longer the time allowed for this protecting or preventive process, the more assured will the effect be on the plank.

There are still other methods of constructing small dwellings economically, and at the same time producing a very pleasing effect externally, and securing a great amount of comfort within. The objection to clapboarded houses is, that the cold will penetrate between the joints; and this defect increases with the "buckling" which the clapboards undergo from the influence of the sun's heat. As a simple preventive of this

free admission of cold, we would recommend brick-nogging between the studs; or, in case no studs are used, and the house is in the balloon style, previously described, it would be very desirable to cover the inside boarding with brown paper, carefully pasted together, with a sufficient lap.

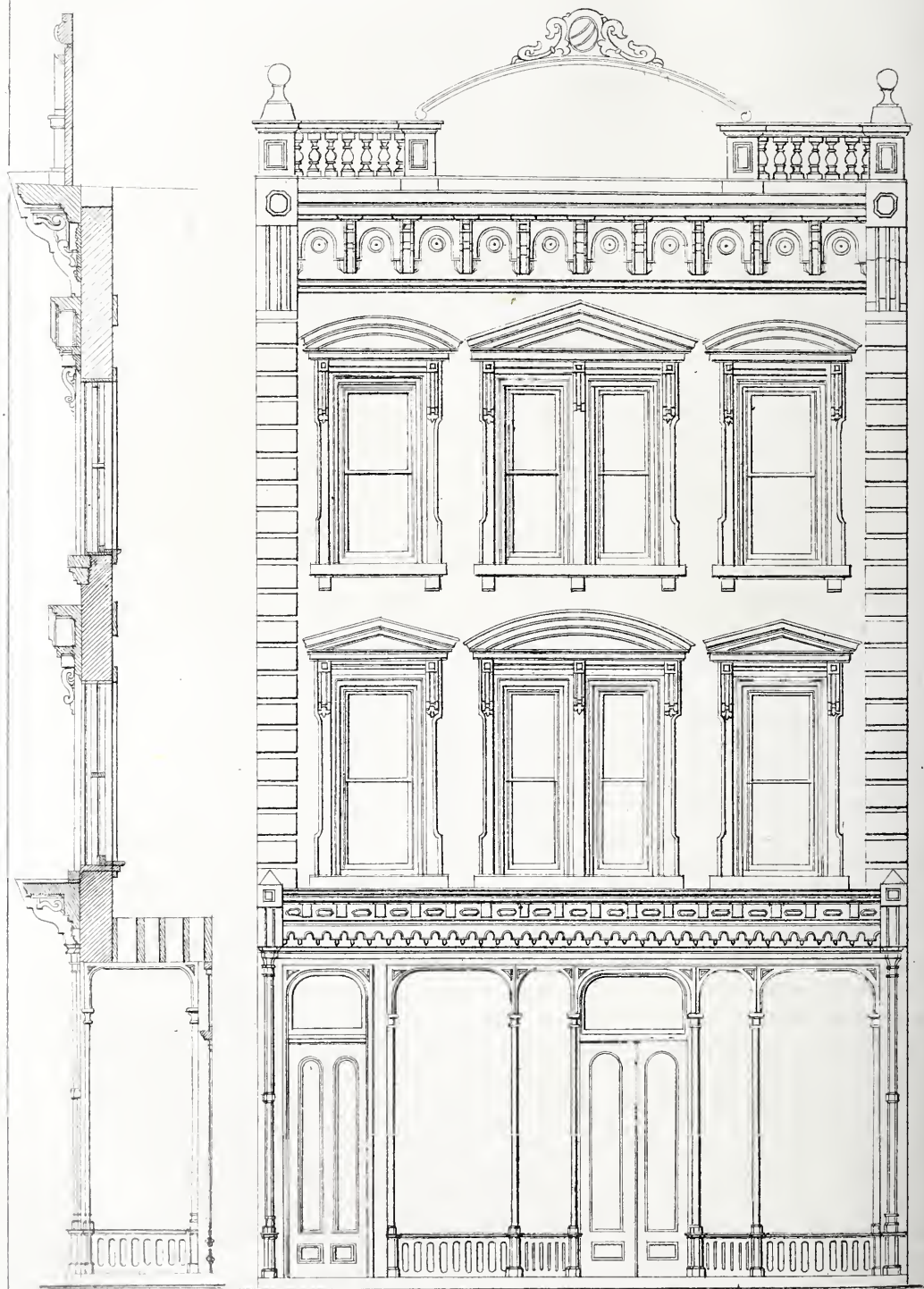
In all our cities there can be found on sale, covering materials, such as felt, prepared paper tarred, etc., manufactured expressly for this purpose, and at prices so reasonable that such material becomes as available as it is very desirable. There is another point in this closing out of the weather; it protects the internal plastering from drifted snow or other damp-creating influence, and consequently insures the dryness of the house. Shingling may be very effectually used instead of clapboarding, and produce a good effect when judiciously cut, with either squared or rounded corners.

The effect may be made very unique by continuing the window sills in a course forming a belt all around (at least on the exposed sides). Under this belt-course, nail on vertical plank-ing, covering the joints with bevelled slips; and over the caps of the windows up to the fascia of the cornice, either do the same, or put clapboards. In the intervening space, nail on shingles with their angles cut off; and mark the line between them and the clapboarding by the introduction of a neat fillet molding. This will be a little more troublesome, but will amply repay in the prettiness of effect thereby produced.

The hoods and trimmings, over doors and windows in these wooden constructions, may always be made ornamental and highly expressive features of the peculiar style of design in which they are built.

The roof should have at least one belt, of four or five courses of ornamental cut shingles, painted a bright color; and the combing should be as fanciful as economy will admit of.





Section.

Plan.

DESIGN FOR A STORE FRONT.

THE requirements of peculiar business pursuits call for constant effort on the part of the Architect to meet them. In the great majority of stores, the show-window is the grand point on which the main utility of the design, and of course, its actual value depends.

The object to be gained being the greatest amount of available display-surface, it is necessary to obtain that by every means possible, and it is with such an end in view that we present our practical readers with the accompanying design for a store front, the superstructure of which has been considered with a view to attractive effect.

The antiquated mode of straight fronts, with long outside shutters, is rapidly becoming obsolete; and, instead, our stores are made to economise space, and to do without the terrible nuisance which porters have had such sad experience of through severe weather, "putting up and taking down shutters."

Our eastern cities have completely reformed store front architecture, and by every means and device have increased the surface of display windows until every available foot of frontage is utilized.

The design here illustrated is twenty-eight feet front in the clear; from which deducting the hall and walls, the actual store front is just twenty-two feet. By keeping back the store doors five feet, it will be seen that the show front is one-third more than by the straight method.

This store window frame is of oiled walnut, the columns being three inches diameter, and the height is fourteen feet. The bressummer is on the bow-string principle, the cornice with its brackets and consols being of walnut, as are also the doors. The base is of white marble, standing on a marble plinth, six inches high; and the panels of the base are

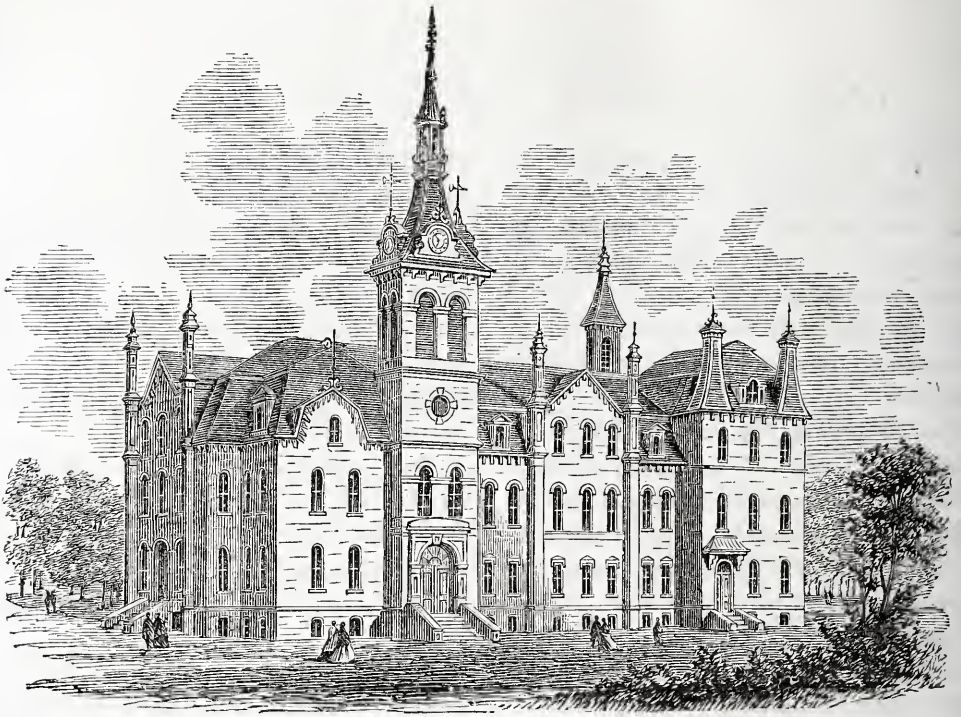
pierced and glazed to light the cellar, as shown in the illustration.

The windows are all plate glass. Instead of the solid wooden shutters of by-gone days, galvanized wire-fenders are now becoming popular. These are light and effective, being only of a height to protect the glass from injury (accidental or otherwise) from passers-by.

The superstructure is of Milwaukee brick, and the trimmings and dressings are of Ohio stone. The main cornice is of wood, painted and sanded to imitate the Ohio stone composing the dressings.

NEW ASYLUM FOR THE INSANE.—Yesterday, according to advertisement, was the last day for receiving plans for the new Insane Asylum which the Commissioners of Emigration are going to erect on Ward's Island. The time expired and but two plans had been deposited with the Superintendent. The reason why there were so few is the fact that the limit of time prescribed in public announcement is well understood to have no essential force, and does not debar the putting in or reception of any number of plans up to the very hour the examining committee meets. The new asylum, which will be contiguous to the old, will comprise a main building and two wings, and appropriate departments for the sexes. The old asylum will stand still, and be used for auxiliary purposes to the new institution. It will contain laundry, kitchen, etc. Until the plans are examined and pronounced upon, first by the Committee, and finally by the Commissioners, the exact particulars of the new building cannot be stated.—*New York Tribune, Feb. 16th.*

Since the above was in type the Commissioners have made their award by choosing Mr. Carl Pfeiffer's design. We hope soon to be enabled to present a description of this Asylum.—[EDS.]



STATE NORMAL SCHOOL,

AT WINONA, MINNESOTA.

WINONA, the capital of the county of the same name, is located on the Mississippi river, and is distant from St. Pauls one hundred and fifty miles. It is the eastern terminus of the Winona and St. Peter's Railroad, and is a flourishing town of between four and five thousand inhabitants, is graced with several architecturally effective public buildings, among which we now rank the above.

It cost \$140,000, which sum was raised, first by a legislative appropriation, in the year 1866, of ten thousand dollars; and secondly, by private subscriptions, the latter fact speaking volumes for the spirit and liberality of the citizens. The design is very effective in its outline, and in no way bordering on the extravagant.

The style is Norman, with French treatment. We regret very much that we have not the plans of the interior, as we would be pleased to note the arrangement of the various class-rooms, etc.

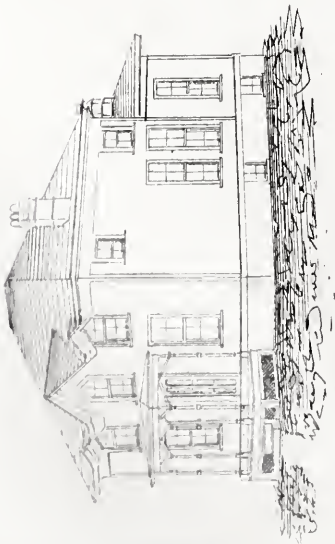
The above perspective has been kindly furnished us, by that popular and enterprising publisher, Frank Leslie, in whose illustrated newspaper it first appeared.

Minnesota has also two other normal schools, one at Maukato, a post village, capital of Blue Earth county, on the right bank of the Minnesota river, a little below the mouth of the river from which it derives its name; and another at St. Cloud.

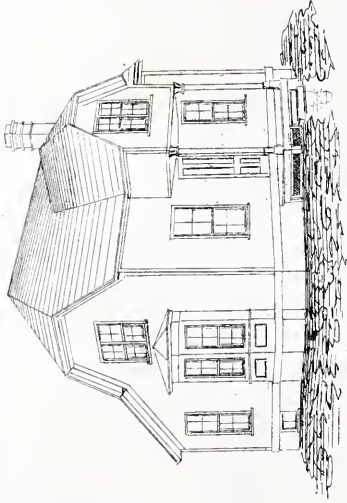
The Normal School at Winona represented above, is now in successful operation.

Before leaving this subject we would say, that we once asked the kind aid of the teachers, and friends of education generally, to enable us to open an illustrated department, which might, by giving the views of many collegiate institutes and schools, afford valuable information to those about to construct such buildings in any part of the country. We will not dwell on the many advantages of such a collection of practical hints.

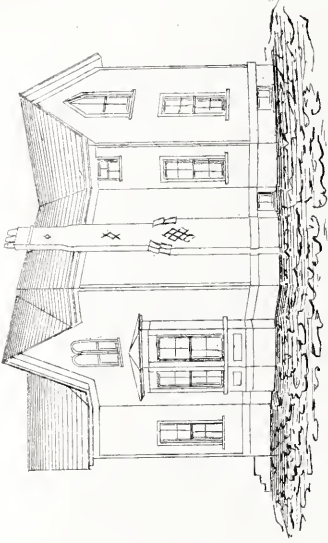




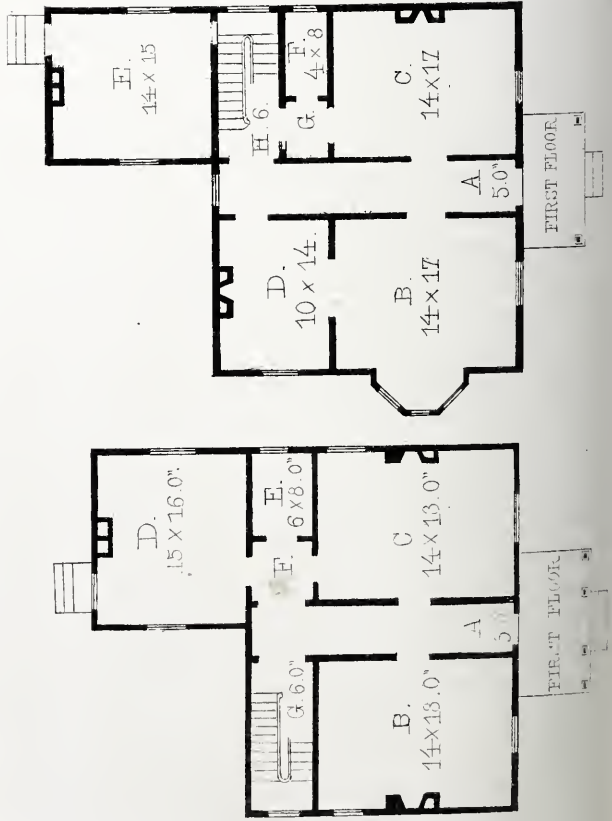
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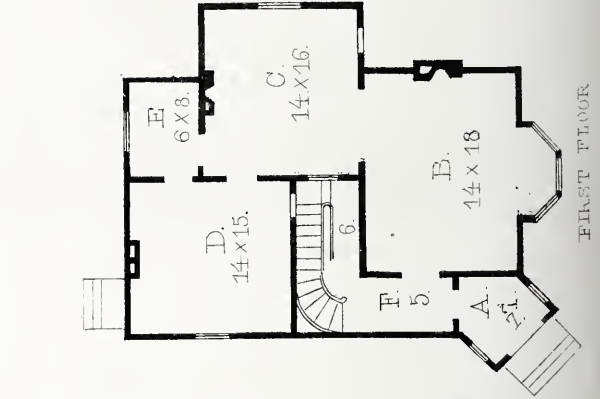
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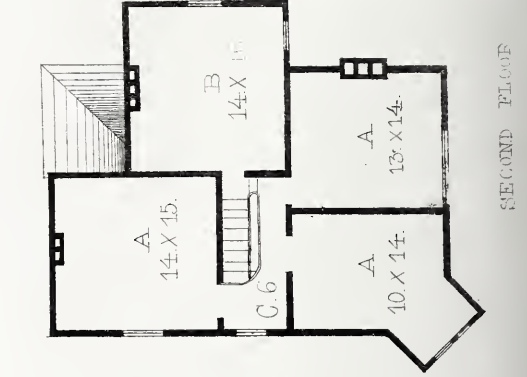
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DESIGNS FOR THREE COTTAGES.

WE here present three designs for cottage residences of the larger class, being all two stories, and some having attics. These, strictly speaking, are not cottages, but houses ranking between the smaller class of villas and the cottage proper.

They are intended to give ample accommodation to a small family, and at the same time to make something of an effective elevation, without being indicative of any particular style of architecture; domestic construction of the utility class being the intention.

No. 1, is a broken plan or outline, with pedimented front, the roof being of the ordinary pitch. The letters on the plan refer to the several rooms as follows: A, Hall. B, Parlor. C, Dining-room. D, Kitchen. E, Pantry. F, Passage. G, Stairs.

The ventilation in this house is complete. It is well lighted, and in every respect healthful and convenient.

No. 2, has a peculiarity in its roof which had its origin in the old English farm house, namely: canting off the apex of the gable. To some this is rather pleasing than otherwise, still to many it appears not only an uncalled for additional expense, but a very objectionable treatment of a gabled roof; dwarfing, or depressing the elevation, instead of improving it, by giving the effect of height which the pointed gable produces.

The plan of No. 2 is: A, Hall. B, Parlor. C, Dining-room. D, Library. E, Kitchen. F, Pantry. G, Passage. H, Stairs. In the treatment of the next design, or No. 3, the irregularity of outline is the most expressive feature, and it gives the advantage of presenting a front from several points of view. The vestibule is so situated as to render the hall comfortable, by shutting it off from the outer or entrance door. A, is the Vestibule. B, the Parlor. C, the Din-

ing-room. D, the Kitchen. E, the Pantry. F, the Hall.

Of this design we give the second floor plan, which is thus arranged: A, A, A, Chambers. B, Servants' Sleeping room. C, the Landing. The Pantry on first floor is roofed over; the roof is shown on this plan.

The constructive material may be of any description that is available or desirable. Any of the three would look well in stone, brick or wood.

Fire places are liberally provided throughout, a most desirable feature in a house constructed with a view to hospitable comfort, which must always surpass the modern and very general innovation of hot air, and hot water-pipes, with their small ornamented registers for the outlet of heat. We all love to look upon the fire in its glowing generous gladness; and no amount of mere caloric can compensate for its absence. In those designs where the chimney is located on the outside of the dwelling, we would recommend the building of it in double thickness next to the exterior, and leaving a hollow of even two inches between the two thicknesses. Such a precaution would prevent the weather influencing the temperature of the flue, and retarding the necessary draught.

The following sensible observations of Mr. J. C. Loudon, although of a day now gone by, are worthy of attention as leading to a more intimate knowledge of the subject of flues and fire places, which it would be well if many of our dwelling-house contrivers would ponder over and take a lesson from. Mr. L., says:

"The rounding of the chimney breast, and the contraction of the throat of the flue, whatever may be the kind of grate adopted, are points which contribute materially to the free draught of every chimney. The chimney breast requires to be rounded, in order to direct the current of cool air drawn from that of

the room gradually upwards, so that it may mix in by degrees with the current of hot air ascending from the fuel chamber, instead of striking against it at right angles, which it must necessarily do when the chimney breast is not rounded. The object of contracting the throat of the chimney, is to diminish the quantity of heat drawn from the room, by the current of air which is continually passing up the chimney; but the same contraction, it is justly observed by Mr. Tredgold, often augments the draught to such a degree, as greatly to increase the consumption of fuel. The grand point to be attained is, such a draught as will do nothing more than carry off the smoke, and keep the fire clear; because then there is the greatest radiation from the fireplace, with the least waste of hot air from the room. The rounding of the chimney breast may either be effected by having a stone lintel or a cast-iron one. In countries where stone is so abundant lintels of that material are thrown across the openings of the fireplaces, the under side may be rounded off and the throat of the flue gradually contracted, till, at the height of two or three feet from the chimney breast, the superficial area, in ordinary cases, is not more than 90 or 100 square inches; this being found by experience to be a suitably sized flue for an ordinary coal fire. When this contraction has been neglected in building the chimney, or done improperly; or when it is found necessary to contract the throat still farther, to create a draught; this may be done, in stone countries, by a piece of flag-stone, set on the surface, which may be moved backward or forward to adjust the draughts to the degree required. When fires are no longer wanted, this stone may be brought forward so as to lean against the breast of the chimney, to close up the flue; or be thrown back, when the chimney is to be swept. That this may be done with ease, and without dirtying the hands, the stone may be

removed by inserting the points of the tongs in two holes cut in its face for that purpose. In countries where brick is the principal building material, the chimney breast, as we have seen, is built on an iron bar; this bar is generally flat, and about three inches broad; consequently its inner edge presents a sharp angle, instead of the rounded surface. The contrivance for contracting or closing the throats of chimneys, in brick-built buildings, is either by a plate of cast iron, formed with a base so as to stand like the stone. In the latter case the plate is furnished with a turn latch, which may be worked by the tongs, so as to regulate the distance between its upper edge and the breast of the flue. It may be taken out to admit of sweeping the chimney; or the flue may be completely closed by it. 'When the chimney top is properly contracted,' Mr. Tredgold observes, 'a register at the throat is not wanted, and it is always desirable to do with as little machinery about a fire as possible.' He says that he makes the contraction at the top in order to reduce the opposition which the wind, and even the resistance of the air, make to the ascending smoke; also to prevent the chimney from being cooled by double currents of air (which is often the case in wide chimnies), and to diminish the loss of heat which would be required to sustain a current of smoke in a large flue. If the contraction were made only at the throat, the force of ascent would be diminished at the first effort; it would be like contracting the aperture of a pipe which supplies a jet; besides, if a larger opening were left at the top than what is absolutely necessary, the rain, cold air, etc., would descend, and interrupt the smoke. The degree of contraction at the throat of the flue Mr. Tredgold makes the same as that at the top of the chimney. He avoids all abrupt changes in either the form or direction of the flues; and in 1816, proposed in the *New Monthly Magazine*, to build them of earthen pipes."



LESSONS FOR LEARNERS.

THE DORIC ORDER.

THE illustrations given on the next pages, show in detail the entablature with all its relative proportions; and also the soffit of the cornice, according to Vignola, likewise the intercolumniation, as laid down by the same eminent architect.

It will be observed by the learner, that although this example of the Doric Order is of the Roman style, yet the terms by which its detailed parts are expressed are Greek. It will be remembered then, that the origin of the Order (as its very name imports), was Grecian, and that the Roman architects in their remodeling of it to suit their requirements, still retained its native nomenclature, which has been handed down to us unchanged, amid the diversity of proportions its contour has undergone since it was first used in the erection of the temple of Juno, at Argos, during the reign of Dorus in the Peloponnessus.

The Doric entablature consists as usual of three members, architrave, frieze, and cornice, the first or lowermost of which, otherwise termed the *epistylum*, is simply a plain fascia surmounted by a broad fillet termed the *tænia*, which forms the separation between it and the frieze, and to which another fillet, with small cylindrical guttæ depending from it, is attached in separate portions beneath each triglyph of the frieze.

Above the architrave is the frieze, which forms the most characteristic feature in the whole entablature, although of no greater dimensions than the epistylum. The height of the two members is nearly equal, with but slight variations in any example, the frieze being seldom, if ever, the deeper, more frequently the shallower of the two. The peculiar ornamentation of this portion of the entablature gives it its specific

character; being divided into a series of projecting and recessed panels. The distinguishing feature is the *triglyph*, which is a slightly projecting tablet, somewhat wider than the semi-diameter of the base of the column, and channelled vertically with three grooves, or *glyphæ*, whence the name triglyph. These channels are so disposed, that there shall be a space in the centre of the projecting slab, with a channel on each side of it, and beyond these again, on either side, another equal space, with a half-groove outside on the edge of the slab, which indeed is nothing more than a chamfered edge. The two channels, and the two halves on the extremities together make up the three grooves, or *glyphæ*.

Beneath each triglyph, and attached to a fillet, are a series of guttæ or drops, immediately under the *tænia* of the architrave. This decoration we have alluded to in describing the epistylum, but although it is attached to that member, it belongs, strictly speaking, to the triglyph, of which it is a continuation; its position, however, in this place, serves a very useful purpose, for it both gives a variety to the otherwise monotonous surface of the architrave, and, at the same time, presents to the eye a sort of connection between this portion of the entablature and the frieze above it. The guttæ are six in number, of a conical form, and are said to represent drops of rain that have trickled down the channels of the triglyph, and settled beneath the *tænia*; others again suppose them to represent the heads of nails, or screws, used in the wooden structure. The channels of the triglyph are of a triangular section, and are not continued the entire height of the block, although at the bottom they butt against the *tænia*. Each triglyph is surmounted by a capital, or slightly-projecting band,

which, in the Greek examples is of very slight projection, and is not returned at the sides, except in the case of triglyphs at the angles of the building. The position of these ornaments is such, that there shall be one over the centre of each column, and one midway between every pair of columns; but there is an exception to this disposition at the angles of buildings, where the triglyph is not placed over the centre of the column, but is brought up quite to the edge or outer angle of the frieze, so that a line dropped perpendicularly from the outer edge of the corner triglyph, would touch the base of the column. This disposition gives occasion for an alteration of the intercolumniation between the two end columns, these being brought closer together by the space of half a triglyph; an advantage is obtained by this means, inasmuch as an appearance of greater strength is given to the extremities of the colonnade.

The spaces between the triglyphs are called *metopes*, and are usually filled up with sculptures in bas-relief, from which circumstance the frieze was called by the Greeks *zoophorus*, because it contained representations of living figures, men or animals. These metopes are usually of a square form, their breadth being equal to the height of the frieze, but there is a slight variation in different examples.

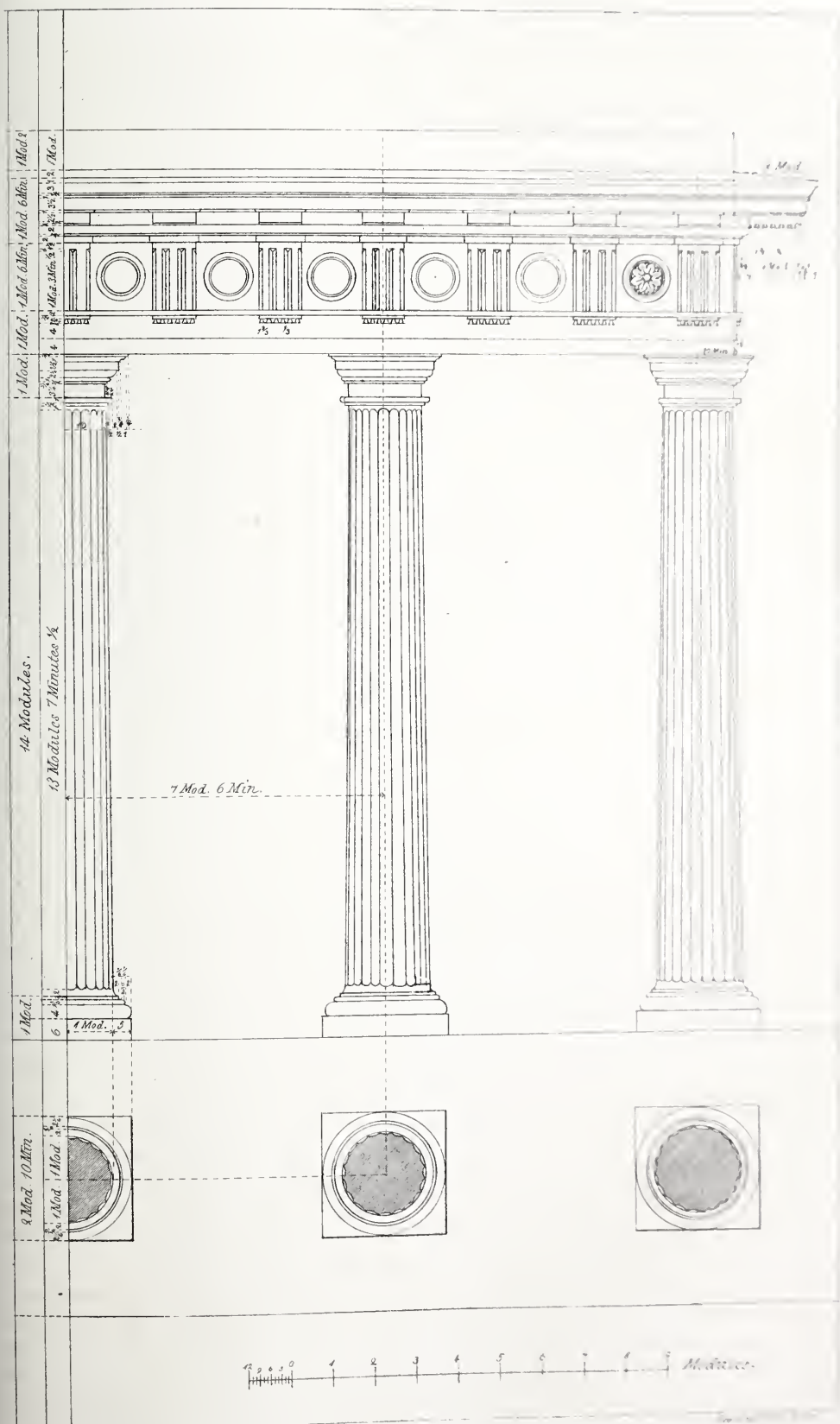
The Doric cornice consists of few, but bold parts, the most characteristic of which are the mutules. These are a series of shallow plates attached to the soffit of the corona, sloping forward, so that the bottom of the mutule in front is considerably lower than at the back, and having their soffits studded with cylindrical or conical guttæ; these guttæ were eighteen in number, and placed in three rows of six each. A mutule was placed over each triglyph, and an intermediate one over each mutule; their width being equal to that of the triglyphs. Under the mutules was generally a plain band, but sometimes an

ogee is found in this place. The corona is a boldly-projecting flat molding, of somewhat greater depth than the abacus of the capital, and is generally finished off above with a small ovolo and fillet supporting the cymatium, which consists of two similar moldings, but of more imposing dimensions. In raking cornices the mutules are omitted, but a new molding, termed the *epitithedas*, is added as a finish, which is either an ovolo or cymatium.

When used, the epitithedas was continued a little way at the angles, and terminated against a carved block. The pediment in this order is of a low pitch, and always about the same height, whatever the span may be; upon an average the height equals that of the entablature, more or less, but is scarcely ever so great as to make the tympanum higher than the entablature.

INTERCOLUMNIATION.

The subject here illustrated is one of very great interest to the student; for, there is nothing on which the beauty of effect so concentrates, as on this one feature of a design. Place your columns too close, and the whole has a crowded, heavy, and very displeasing appearance. Set your columns too far apart, and the effect produced is one of weakness and poverty of design. There is a medium which must be observed, and it is governed altogether by the proportion the height of the columns bear to their distance one from another. On this subject very great authorities have, in all ages, differed much. Following the rule of proportion we will here state what must, on reflection, be obvious—that the intercolumniation of the several orders differs in proportion to their relative heights. For the Doric Order (of which we now speak), we select Vignola's treatment of the subject of intercolumniation, as being very graceful, and at the same time presenting the requisite attributes of strength. It will be observed that he makes the distance seven and a half



Intercolumniation of the Doric Order according to Vitruvius.



modules from centre to centre, and arranges his triglyphs accordingly.

This order, as practised by the Romans and Italians, differs in some essential particulars from the Grecian, and in process of time its original character seems to have been all but entirely lost, the identity being evidenced only by the remains of some few details. The few points in which the resemblance between the Greek and Roman orders is preserved, are—the employment of triglyphs and metopes in the frieze, and of mutules in the corona, the fluting with arrises instead of fillets, when indeed flutes were introduced, and the general form of the capital consisting of echinus and abacus. The distinctions are much more numerous; among which may be mentioned the elongation of the shaft, and the not unfrequent absence of flutes; the addition of a base, variations in the form of the capital, and of the several members of the entablature, the amplification of moldings and such like; so that were two examples, one of each kind, placed before a person unacquainted with the subject, he would have greater difficulty in tracing their resemblance, than in pointing out their incongruities.

The height of the column is increased from six to eight diameters, and in some cases, as recommended by Vitruvius for porticos, to eight and a half. It is either fluted or left plain, and sometimes is partially fluted, the channels extending about two-thirds of the shaft the remaining portion below, from the base upwards, being left blank.

The addition of the base follows very naturally the elongation of the shaft, for were it still to be omitted, the lower portion of the column would look too small, and would give to the edifice an appearance of weakness; the columns would seem unsteady; whereas in the Greek examples, the massive proportions and the rapid spreading of the shaft from the capital downwards, gives the effect of strength and stability. The

base generally used is that termed the attie, and consists of a plinth, a torus, a hollow molding or scotia with a fillet above and below it, upon the uppermost of which is another torus and fillet, out of which the shaft rises with an apophyge; a simpler base, however, is sometimes made use of, comprising only a torus and two shallow fillets above it, and occasionally merely a plinth and simple fillet.

In the capital, the sunk annulets of the Greek examples are converted into projecting fillets in the Roman; the shaft is separated from the cap by an astragal which gives much greater distinctness to the necking, which again is sometimes relieved with rosetts and buds, or other ornament. Above the neck are three flat annular fillets, and these above the ovolo surmounted by the abacus. The ovolo, however, is not of so much importance as in the Greek order, nor of the same severe contour; the abacus likewise is much shallower, and has the addition of moldings on its top. The height of the capital is equal to $\frac{1}{2}$ a diameter, or 1 module, but this is not always the case, for in the Theatre of Marcellus at Rome, it is 33 minutes, and in the Coliseum as much as 38.

The architrave is often similar in appearance to the Greek, but is of less height, being equal to only two-thirds of the frieze, or half a diameter; in a few instances, the architrave is composed of two fascias. The new frieze is also very similar to the old one, with some slight exceptions, the mutules being frequently filled with ox-skulls and pateras, and sometimes left plain; the capitals of the triglyphs are of greater projection than before, and are returned at the ends.

In concluding this lesson on the Doric Order, we will call the learners attention to this distinctive feature between the composition of its cornice and that of Palladio and Sir William Chambers. While Vignola makes the extreme projecting molding a *sima recta*; the two latter masters agree in making it a *cavetto*.

INSTITUTION FOR THE DEAF AND DUMB,

BELLEVILLE, CANADA.

THE traveller, in quest of the beauties of Nature, who visits the magic panorama of the Thousand Islands, River St. Lawrence, will do well to sail up the Bay of Quinte, to some fifty miles west from Kingston, (once the capital of Canada), and, embosomed in the richest farming country, he will find the pleasant little county town of Hastings, called Belleville, with its thriving and thrifty six thousand inhabitants, and here too will he see that interesting proof of the Dominion's philanthropic care for its unfortunate subjects deprived of the blessings of hearing and speaking.

We have to thank our cotemporary, the *Canadian Builder*, for the illustrations and accompanying description:

"This building, for the Deaf and Dumb Institution, is erected at Belleville Ontario, immediately west of the town, on the shores fronting the bay. The building is designed in the domestic style of Gothic architecture, modified to suit the requirements of the climate. The style is particularly well suited for an institution of the kind, being collegiate in appearance, and capable of being erected more economically than any of the same dimensions. The main building is 208 feet long, with an average width of 50 feet. In the rear of the main building, but connected with it by a covered passage is the dining-room, which is 60 feet long, and 30 feet wide; a kitchen 32 feet long, by 24 feet wide; also, a store-room, pantry and cook-room; over the dining-room is the lecture-room, having the seats raised at the rear, radiating from the teacher's platform, behind which are large slates built in the walls for writing on. Over the kitchen extension are the male and female sick wards, each having separate entrances, and supplied with baths and

water-closets. There will be three entrances in the front, the principal one in the centre of the building being for the superintendents and visitors; the two side ones for the male and female students respectively.

"The first floor is wholly occupied with dormitories, matrons and students rooms, assistants rooms, clothes rooms, and class rooms.

"The second and attic floors are taken up with dormitories, which have ceilings fourteen feet high, and are thoroughly ventilated.

"There will be accommodation for over 350 pupils of both sexes; particular care has been taken in arranging the building, to have the sexes completely isolated. The dining-room is entered by covered passages from the male and female halls.

"There will be ample play yards on each side of the building, enclosed with high fences, for the males and females; also, large covered sheds for play in winter and wet weather.

"The building will be heated with steam, the boiler room being away from the building, but so arranged as to connect with the fuel cellars, under the kitchen extension. The ventilating flues will connect with the boiler chimney stack in such a way as to secure perfect ventilation.

"The buildings are to be erected with brick and stone, which can be procured in the neighborhood, and will present a façade of over 200 feet in length, and about 50 feet high to the eaves. The roof will be of Mansard construction, fitted up with dormer windows and gables, and is covered with slate and galvanized iron, and surrounded with handsome iron railings.

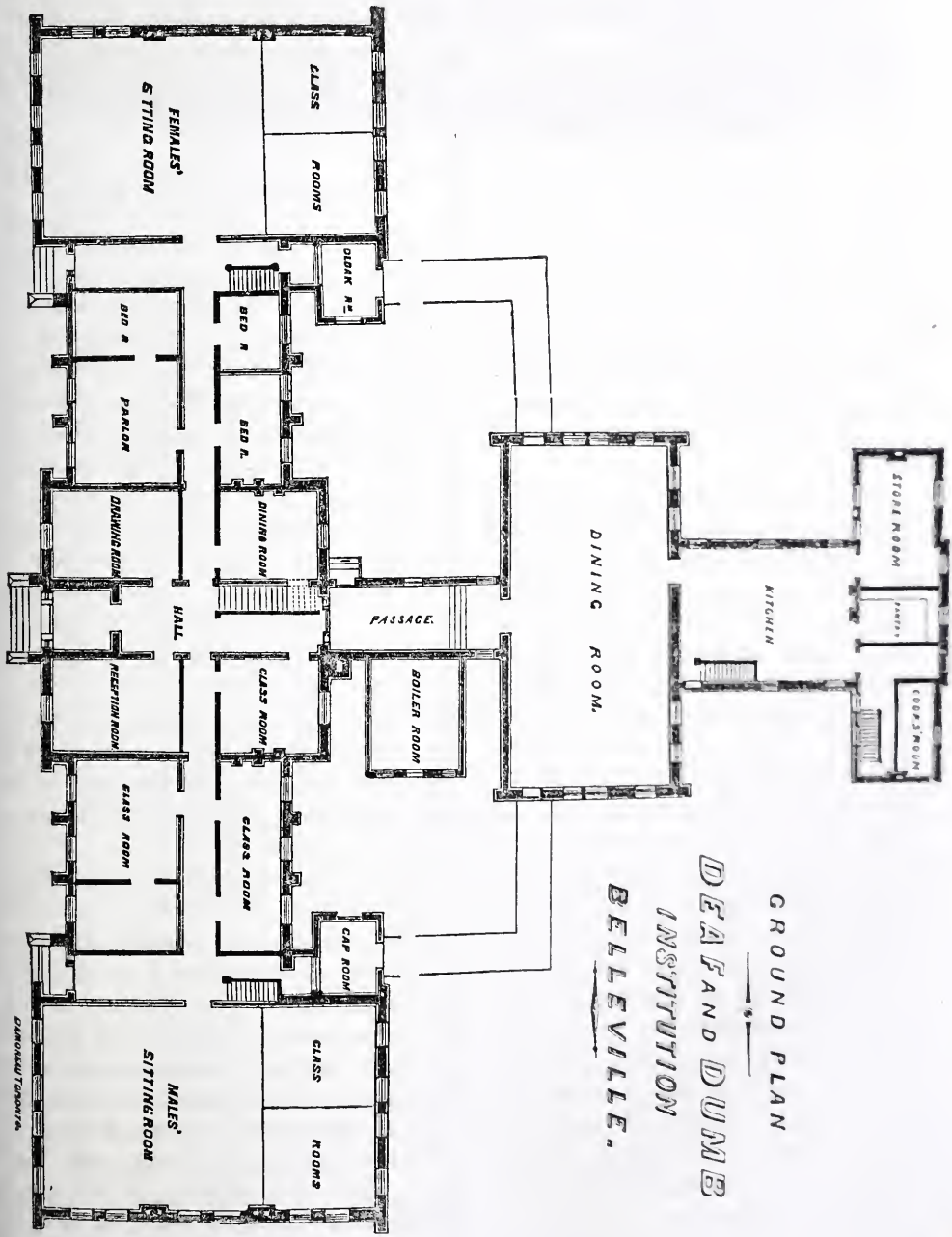
"The front will be in five divisions, the ends and centre projecting six feet

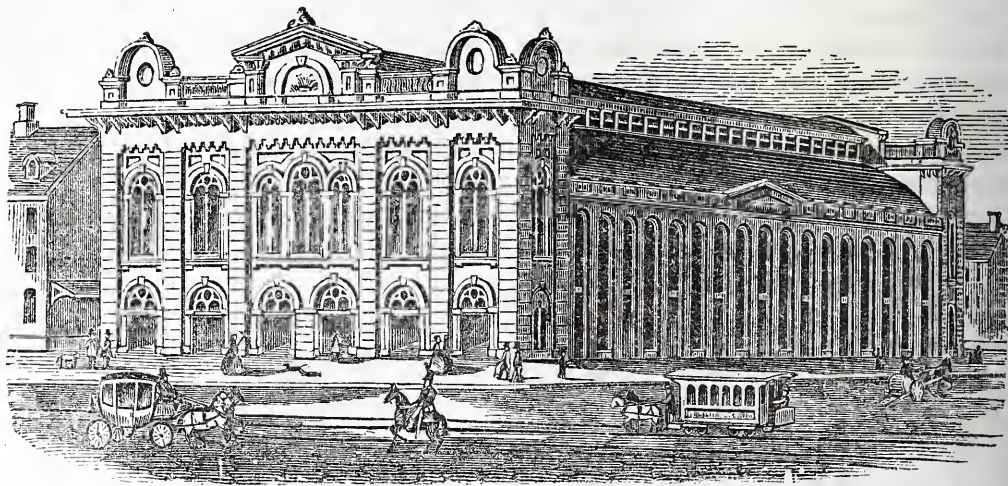


from the main wall; the lower windows will be arched, with brick buttresses between them; the upper windows will be grouped, or in pairs, with flat arches, and connected together with stone string moldings.

“The front entrance is under the tower, and is arched, with small arched

windows on each side, and flanked with massive buttresses; over the central doorway are two grouped windows, and then a large tracery window, and the whole is finished with a tower, with very steep roof and spire termination, with ornamental wrought-iron vane.”





FARMERS' MARKET, PHILADELPHIA.

AT a time like this, when overcrowded cities find the want of fitting markets unendurable, and longing eyes and anxious ears are directed to every hopeful suggestion of reformation and extension, how welcome is the promise of a new—"a mammoth market."

Metropolitan New York, with its dirty "Fulton," and abominable "Washington" Markets, is the most concerned in this improved state of things, and hails every such promise with a pleasure which would be perfect were it not for the disheartening memory of that trite old say: "There's many a slip 'twixt the cup and the lip."

The dread of "municipal jobbing," has heretofore restrained the desire of the denizens of the Empire City for a new public market equal in proportions, and all other requirements of such buildings, to their now too long existent wants. A company of capitalists has, however, been formed, (as we stated in a former number), which bids fair to realize the utmost hopes of the community. There being no political plums available in such a public benefit, it cannot but prove worthy of all the good wishes which will surely accompany it from inception to completion.

It is but fair to give some little credit to municipal effort, whenever such an

event arises, and in this regard we must allow that the civic powers of New York did erect a market of considerable dimensions (just finished), but unfortunately located their boon in such an out-o'-the-way spot that, notwithstanding the illuminating power of the neighboring gas-works, the great body of the marketing people cannot possibly find it; and mayhap, if they should drop upon it, would be so overpowered by the peculiar odor of the locality as to avoid it ever afterwards. Yet it is a new market, and the tax-payers ought surely to be thankful.

New York must and will look to her interests in this matter sooner or later; and many markets will yet arise in convenient places to supply the wants of that omniverous city.

There is no public construction for the advantage of domestic demand and supply, can equal the market—and every community is concerned in it. Some cities are better supplied than others by many degrees. Baltimore and Philadelphia, for instance, are pre-eminent in this respect; and many others can show some fine markets, if not enough of them.

In our wonderfully progressive country, where the population of cities is constantly doubling itself, is it not a subject of very great interest to all? Our city has twenty-three public mar-

kets, namely: Germania, Fairmount, Farmers' Western, Kater, Pine-street, Richmond, Frankford, Germantown, Union, North Second-street, South Second-street, Girard-avenue, Spring Garden-street, Callowhill-street, Ridge-avenue, South Eleventh-street, Shippen street, Eastern, Farmers', Union (Seventeenth, above Market), Twenty-fourth Ward, Twelfth-street, and Western.

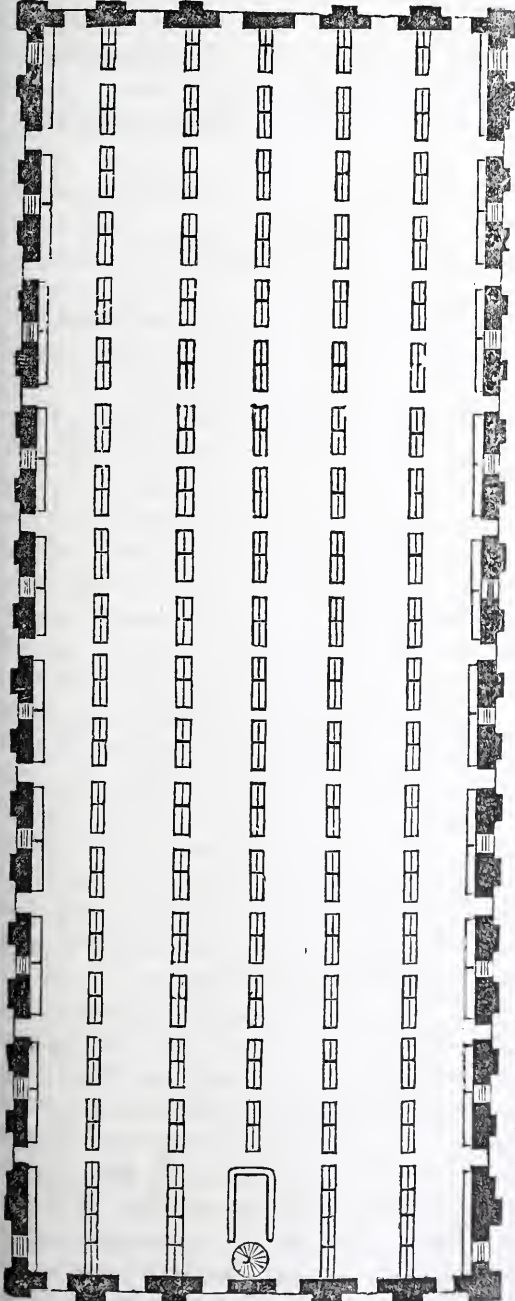
There are two Farmers' markets, the

one is specially designated the "Farmers' Western," situated corner of Twenty-first and Market streets; the other "Farmers' Market," is between Eleventh and Twelfth on Market street.

The perspective and plan here given represent the latter, or FARMERS' MARKET, the length of which is three hundred and six feet; the breadth is one hundred and seventy feet, and the height eighty feet. Its cost was \$260,000.

The markets of Paris have afforded many of the desirable features which give certain advantages to this design. The construction of those popular institutions is one of long experience with the French architects, dating back to the reign of Philip Augustus, or more properly to that of Francis I., who caused halls to be erected with stone columns, and dark galleries, obstructed with irregular stalls. A century ago these inconvenient and most unsightly buildings were removed to make way for a more civilized mode of constructing markets; and toward the close of the eighteenth century, the great *Marché des Innocents* was erected on the site of the old burial ground attached to the church of the Innocents. The unsupportable evil of a vast area of ground filled with human remains, the accumulation of eight or nine centuries, was got rid of by removing the remains to the Catacombs, and entirely renewing the soil on which was commenced that great market, which stands to this day an example for like constructions. In the centre stands the celebrated work of Pierre Lescot, known as the *Fontaine des Innocents*. The sculpture of which was by Jean Goujon who was shot during the massacre of St. Bartholomew, while working at one of the figures. It consists of four arches the piers of which are faced with Corinthian pilasters resting on pedestals, and crowned with a sculptured frieze and attic surmounted on each side by a pediment, and finishing with a small dome.

In the midst stands an overflowing



vase, from which the water falls in a triple cascade into stone basins attached to the basement. Jets of water issue from the mouths of four recumbent lions, adorning the corners of the base. Around the whole is a large square basin, approached by steps. The height is forty-two feet. It is a very valuable monument of the *Renaissance des Arts*.

The *Marchè des Innocents* is, however, absorbed with its extensive area, by the modern New Central Halles; the fountain just described still occupying the centre. Fifteen acres of site are covered by this most elegant construction, the

works of which are estimated to have cost over forty millions of francs. The expense to the city of Paris of the houses pulled down to add to this renovation, being twenty-seven millions of francs.

Not having our national energies concentrated on one city only, as is the case with France, we may not expect ever to rival the Gallic capital in the construction of markets, yet feel confident in the ability to suit the wants of our people, if not with municipal or state assistance, certainly with the energy and liberality of private enterprise.

MODERN FRENCH ARCHITECTURE.

THERE are few cities in the world that have made a greater advance in modern improvement than Paris, and it is the exponent of all France. The awakened interest in architecture which has made itself manifest in that capital, spreads like a circling wave of sound, wider and wider over the land. In that, as in all countries where the influence of the Roman Catholic Church prevails, this progressive feeling is to be found principally in Ecclesiastical Architecture, the consideration of which leads to a general study of the whole subject.

The art of architecture is connected at so many points with the habits, manners, and customs of the people among whom it flourishes, and it reflects by its structure and adaptations so much of the influence of climate, government, and the other external circumstances of a nation, that some general knowledge of the subject is essential to every one who would extend his inquiries into men and things beyond the narrow circle circumscribing his own immediate interests. Architecture has been happily termed, "History in Brick and Stone;" it is so, but it is also manners, morals, religions, modes of thought,—petrified—fossilized, so to speak, and preserved for the

inquiring minds of future ages, as illustrations of the animated pages of history. But it is not necessary always to contemplate architecture in this retrospective manner. It is equally calculated to throw light on the moving panorama of the living, breathing world around. Comparative anatomy has done much to throw light on the structure and functions of the animal creation, and to raise our admiration of the works of Nature's great Architect. Comparative architecture must tend, though in a lower degree, to expand the mind, to furnish it with new ideas, to exhibit the constructive powers of the human intellect under other circumstances than those we have been accustomed to, and, while teaching lessons of humility, teach also the capabilities which lie dormant until necessity calls them forth.

The development and progress of architecture among our continental neighbors, is always an interesting subject, whether considered in reference to the magnificent remains of former times, or to the state of the arts of construction at the present day. The fine feeling of art and the general good taste of our French brethern none will dispute; and if all who visit the conti-

ment, and are capable of appreciating the subject, would describe in simple terms the buildings they have seen and the impressions derived from them, a mass of information would be accumulated of a very useful character. The following critical observations of a close observer contribute in some slight degree to so desirable an end.

Architecture and building in France at the present time are in a decidedly prosperous condition. Several causes have combined to produce this state of things. The agricultural, commercial, and manufacturing classes are, for the most part, fully employed. Capital is abundant and money cheap. The reaction from the general paralysis caused by the revolution of 1848, is infusing vigor into every department of industry. The French people expect much from the new dynasty of rulers; whether their expectations be realized or not, it must be admitted that the present government, by public grants in some cases, by subsidiary contributions in others, and by exciting a spirit of emulation in every locality, has done much to stimulate the spirit of enterprise in undertaking and carrying forward great public works in every part of the country.

In no department of architecture is improvement more visible than in the attention now paid to the preservation and restoration of the magnificent mediæval structures with which France abounds. In this respect a wonderful change for the better has passed over the public feeling of France. For a long period previous to the first revolution a spirit of carelessness and neglect had been indulged, which had allowed much devastation and ruin to be perpetrated, to which the reckless and blind fury of the revolutionists merely put the finishing stroke. Much destruction was then perpetrated which no exertion can ever repair. Many noble structures were levelled with the ground, and many others were diverted from their sacred uses and degraded to the basest pur-

poses. The feebleness of the Gallican church for a long period prevented any efficient attempts to remedy this state of things. Public opinion was indifferent or hostile to any movement in this direction. Of late years, and more especially since the late rapid changes in the government, a signal revolution has manifested itself in the public mind in reference to this subject. A strong and decided feeling in favor of mediæval architecture has begun to prevail. This has been greatly encouraged by the establishment of antiquarian societies in the various provinces, which pursue their researches with considerable zeal and earnestness.

The growing influence of the church and priesthood, thus encouraged by public feeling, and fostered by the assistance of government funds, has led to restorations of the most extensive character in most of the great ecclesiastical structures. Unsightly hovels and clusters of humble buildings, which had been allowed to nestle between the buttresses, and shroud the rich carvings of the churches, have been swept away. Tottering old houses, which had obscured the view of noble façades have been ruthlessly levelled with the ground. Crumbling and shattered masonry has been removed and replaced. The splendid ranges of statuary and tabernacle work, which the iconoclasts of the revolution had battered and mutilated, now shine forth in many cases with more than their original splendor and richness.

Two circumstances existing in France have materially contributed to increase the facilities for this work of renovation. One is, the abundance of excellent building-stone easily accessible in every department north of the Loire. This material, sometimes gypseous and sometimes calcareous in its composition, is beautiful in color, readily worked, applicable to the most delicate tracery and moldings, and for the most part durable when exposed to the weather. The other

circumstance is, the existence of a numerous class of operatives, above the common stone-cutter, and yet not aspiring to the rank of artist; men very capable of executing the minutest details of Gothic sculpture and tracery, with characteristic spirit and boldness, and at a price which keeps the outlay within moderate bounds.

Many of the buildings where the restorations are in progress will be brought under our notice as they proceed.

It is a remarkable fact, account for it how we may, that the attention which has recently been paid in France to the mediæval remains, has not hitherto led to the revival of Gothic architecture to any appreciable extent in modern buildings. A few specimens undoubtedly exist, but they are exceedingly meagre both in design and in detail. The spirit which seems quite capable of entering into the feelings of ancient art when working under the visible shadow of its influence, appears entirely to evaporate when devoted to original composition. The modern French churches are essentially Italian in their conception and treatment. The larger ones are modeled on the form of the basilica, with clere-story, side aisles, and frequently with transepts and apsidal eastern ends.

A very good specimen of the modern French church is to be found in that of Notre Dame de Lorette at Paris, situated in the Rue St. Lazare, beyond the Northern Boulevards. It is large and commodious; rather plain externally, but highly ornamented in the interior. Its plan forms a Latin cross, forming three aisles with side chapels outside, and apsidal eastern end. The southern front has a bold tetrastyle Corinthian portico.

The organ gallery is carried by a stone screen with columns, the centre part underneath forming an inner vestibule with baptisteries on each side. The church is a basilica in section, the clere-story carried on Ionic columns supporting a straight entablature. The ceilings are flat, divided into panels with consider-

able ornament and gilding. At the intersection of the cross a square tower is carried up with an entablature and attic, which is crowned by a bell turret, square on plan, with arched openings on each of its four sides.

HOW STATUARY IS MADE.—But little is known of the art of sculpture by the masses in this or indeed any country. The first thing the sculptor does is to model or fashion the figure in clay. He first builds a skeleton of iron, and then puts the clay upon it, and adds or takes off until the work is completed. He then transfers the model, or reproduces it in plaster of Paris. This is done by covering the clay with liquid plaster to the depth of about one and a-half inches, more or less, according to the size of the model—a life-sized picture would require the plaster to be laid on at least three inches in depth.

The plaster is then allowed to become perfectly hard, or to set, as it is called. The clay is then taken out, and the plaster will be found to be a mold in which to cast the fac-simile of the original model. An additional quantity of plaster is then mixed with water and poured into the new made mold; in thirty or forty minutes it will become set and hard. The mold is then taken or cut off by means of knives or chisels.

The next thing is the process of cutting the head or figure in marble. This is entirely mechanical, and is accomplished by measuring instruments, called pointed machines. They are so arranged as to give the exact distances, points, depths widths and lengths of every part of a head or figure; these are pointed to or measured on the marble block, and the workman cuts to a hair, according to measure, and mathematically certain. Doing a bust in marble is simply mechanical; originating in the clay model is the work of the artist. The process of reproducing works in plaster is carried on in New York very extensively.—*Rural New Yorker.*

HOSPITAL CONSTRUCTION.

THE professional architect is not more interested than is the medical man, and the humanitarian, in the principles which govern the designing and construction of hospitals. We will, therefore, not be considered as being over attentive to this subject, when we draw the attention of the reader to the following observations of *Nature* on "An address on the general principles which should be observed in the construction of hospitals. Delivered to the British Medical Association at Leeds, by Douglas Galton, C.B., F.R.S."

This able address with the discussion which followed it, brings fully before us the question of hospital construction. The address itself is exclusively practical; it goes direct to its object and, by appealing to the results of every day's experience of the benefits of cleanliness, space and fresh air; it points out how these essential elements in the management of the sick, have been embodied in recent hospitals and it indicates by implication, what errors should be avoided.

After stating briefly the work done in this matter by different Sanitary commissions in this country, Mr. Galton gives the following enumeration of objects which must be attained in hospital buildings:

"1. Pure air, that is to say, there should be no appreciable difference between the air inside the ward and that outside the building.

"2. The air supplied to the ward should be capable of being warmed to any required extent.

"3. Pure water, so supplied as to ensure the removal of all impurities to a distance from the hospital.

"4. The most perfect cleanliness within and around the building."

To realize these conditions the first step in hospital improvement is to select healthy sites, away from irremovable

sources of air impurity, and having by this means obtained a pure moving atmosphere, the author proceeds to show how the site is to be used so that the pure atmosphere may not become a disease generator in the wards. The building must be so arranged as to interfere as little as possible with the free, natural movement of the outer air and this free outside movement should be kept up, as far as practicable, within the wards. "Stagnant air is foul air," especially in a hospital.

It has been experimentally shown that ward-air moves most readily when care is taken to combine as far as possible the following requirements: 1st, To let the prevailing outer air currents strike the *sides* of the wards; 2d, To provide that the sun shall shine on the opposite sides of the wards every day he shines, 3d, To have windows on opposite sides of the wards, with the beds arranged between them. A proper use of these opposite windows is the *sine qua non* of ward ventilation and of ward healthiness. But, in cold variable climates, provision has to be made for graduating the ventilation and for warming a portion of the air.

The subsidiary means which have been found to answer in practice are foul air shafts, fresh air inlets close to the ceiling, and warm air stoves—of a peculiar construction described in detail—so contrived that, while the ward is heated by radiant heat, the air warmed is not ward air but fresh air.

The cubic space per patient is determined primarily by the superficial area per bed, which, in its turn, is determined by the area required for efficient nursing. From ninety to one hundred square feet per bed is sufficient, except in hospitals where there are medical schools. The cubic space per bed hence depends on the height of the ward.

There is but one test of ventilation and that is freshness of the ward air. No quantity test is of any avail, hence ventilation, that is, the proper use of the means of ventilation, is an essential part of ward administration. No man or woman who has not a sensitive nose and who has not also a perfect horror of bad smells or closeness, should ever take office in a hospital.

The central point in hospital construction is the ward itself. Which is arranged in conformity with the new class of hospitals; on one side of the entrance is placed a nurses' room; on the other side of the entrance is placed a small scullery. In the ward itself the beds are arranged two and two along the wall spaces between

the windows, with a bed at each corner. At the further end of the ward is a large end window. On one side of this window there is a building, thrown out from the corner, in which are placed the water-closets. The other building, at the opposite corner, contains the lavatory and bath-room.

A very important question, raised by Mr. Galton, is the manner in which hospital accommodation should be provided for recurring epidemics, fevers, cholera and the like. He shows that the cheapest and most effectual provision consists of temporary huts, a result which we commend to those who consider that large, costly, permanent fever hospitals are necessary for London.

IRON IN ARCHITECTURE.

THERE can be little doubt that iron is destined to become the great building material of the time, especially in cities where size and durability are essential in a yet greater degree than the—in many respects—important characteristic of elegance of design and adornment. More costly than brick, but less so than marble, iron in strength, and consequently in adaptation to the two requirements first mentioned, will fulfill to the utmost all that can be required of it. With reference, however, to its availability for decoration and for meeting the truest and best ideas of art, there is more reason for doubt. In the building of warehouses and the like, its shortcomings in this respect may be of minor consequence, but the painted surface of the metal will be objectionable in the grander structures which mark high culture and the possession of well-directed wealth in communities. Upon the surfacing of iron, therefore, will probably depend its ultimate uses in edifices of the class just referred to. The use of paint upon a

noble building is undeniably at variance with esthetic taste, but could the softened color of stone be given to the gray metal, with a permanence equal to that of the material itself, there is no purpose in architecture to which it would not be adapted.

As needs must be from the very nature of the case, the utilitarian tendency of the period disregards both classic tradition, and the ideas of a more refined taste, and in the building of stores and structures intended for similar uses, iron is adopted more and more with each succeeding twelve-month, and there are few branches of the constructive arts that have been more rapidly developed during the past few years. In the new building now being put up for Tiffany & Co., on Union Square and Fifteenth street (New York City), upwards of sixteen thousand pieces of metal are used in the walls and inside columns, varying from half-pound castings to pillars weighing more than three tons each, and surmounted by Corinthian capitals made up of

seventy parts screwed and riveted together. Cast columns are now common of a weight ranging from six to eight tons, and their cutting to length in lathes, and the planing, when required, of their fluted sides, are ordinary operations of the workshop. So also is the fitting and fastening of parts together to ascertain the degree of accuracy attained in the general construction of the work. As for instance, in the putting together, as is frequently done, of an entire store front, twenty-five feet wide by five stories in height, the whole lying prone but complete upon the broad

floor of the foundry, while this primary test of its completeness is being made.

For strictly utilitarian uses in building, iron has already won the day over the old time materials of brick, granite, and marble. Whether for the more ambitious efforts of architects it will ever be universally or even extensively adopted, will depend, as we have intimated, upon whether some method be discovered for preventing the oxydation of its surface, and reducing the cold glare of the bright metal, without recourse to the inadmissible expedient of paint.—*American Artisan*.

THE NEW OPERA HOUSE, PARIS.

EXTERNALLY this immense building is now all but completed; the greater portion of the stone and marble balustrade which surrounds it is finished, and the bronze figures which support the lamps are in their places. The approach to the Imperial Pavilion is marked by a very large and handsome candelabra in the form of rostral columns of red granite polished, with the prows of the ships, bands halfway up the columns, the eagles which surmount them, and the branches for the lights in green bronze.

The Imperial Pavilion is one of the most prominent features in M. Garnier's building, and deserves a few words of description, which a recent visit enables us to give. The Imperial carriages will reach the arch of the Pavilion by an incline of a single curve, set down their occupants within the building, and depart by a corresponding incline on the other side, coach-houses being prepared at the foot for the carriages to wait in. A very easy staircase leads from the vestibule to a lobby in the rear of the Imperial box which occupies the usual position, and is of about the usual width. In the side wall of the lobby is a window which looks

upon the stage. This lobby also connects the Imperial box to the Pavilion over the carriage entrance, a large circular room which is to be magnificently decorated. The principal feature in the approaches to the other portions of the house is of course the grand staircase, which promises to be magnificent; the lower stairs are central, with second flights starting to the right and left from an immense landing. The roof of the staircase is partly supported by suspension rods from the main girders above it. The whole of the masonry work of the staircase is finished, but all the sculpture work has to be executed *in situ*.

The *auditorium* is of about the same size as that of the present Opera House, and it is not in a sufficient advanced state to allow of any further notice, except that the space beneath is covered by a circular and slightly conical roof, all of wrought iron, the main girders radiating from a central ring.

The public portions of the house outside of the *auditorium* are very remarkable. The corridors and staircases are of great width, and the supporting columns, which are of marble have simple iron capitals, which

in a highly decorated building, will have rather a severe effect. The whole of the front of the building is occupied by the grand *foyer*, or public saloon, an apartment of majestic extent and fine proportions, with monumental fire-places at each end; this is connected by several doors with the terrace which occupies the whole width of the façade, and from which the view of the *place* below, the boulevards, and the radiating streets opposite, will be very effective. On the left hand on entering is an immense smoking-room, filling the entire space from the great saloon to the Imperial Pavilion. The pavilion on the opposite side of the building is to be fitted up as a café.

The stage of the new theatre is of enormous extent in every direction; and the dancers' green room, a very large apartment, is situated at the back of the stage, and will, when necessary for effect, form a portion of it. The space devoted to the management, as dressing-rooms, and for subsidiary purposes, is certainly twice or three times as large as in any other existing theatre. The stage en-

trance is in the rear of the building, and very conveniently situated; the scenes and other cumbrous objects will be taken into a court which has a long opening above, communicating directly with the back of the stage by the side of the ballet green-room.

The bronze groups on the top of the building are not yet uncovered, but all except one are in place; the central group, Apollo with some attendant figures, which occupies the central point, was cast in several portions and put together in its place, while the two groups of Pegasus restrained by the poetic muse, which occupy the corners of the upper roof to the right and left, were produced by electro deposit; one of these is in place, the other stands in the court below ready to be raised. Over the angles of the principal façade are two groups of genii. These works are of gigantic size, but it remains to be seen whether even their proportions will render them effective at the great height and distance at which they must be viewed.—*The Architect, London.*

THE ARTISAN AND ARTIST.

THE identification of those who toil by hand and those who work with the brain, is unquestionably proven in an eloquent lecture of the late Cardinal Wiseman, now reproduced in this country, and addressed to American workmen and educators by Elizabeth P. Peabody.

We regret that we cannot afford, on account of its length, to present our readers with this admirable lecture entire.

Beginning with illustrations from metal work, the Cardinal says: "Now, the period in which there was the greatest perfection in this work, as is universally acknowledged, is from about the fourteenth century,—1300, I think, to 1600, or at least after 1500. It is singular,

that, in that period, five at least, very probably more,—but we have it recorded of five of the most distinguished sculptors whose works are now the most highly prized, that they were ordinary working goldsmiths and silversmiths. This is given us in their respective biographies: Benvenuto Cellini, Luca della Robbia, Lorenzo Ghiberti, Brunelleschi, and Baccio Bandinelli, all of whom were goldsmiths and workers at first, developed most extraordinary talent as sculptors. How was this done? Can we conceive a person who is merely a workman, working upon such plate as is put before him, becoming a man of high first class character in Art? There have been examples, but

they are rare. But here we have five men, in a limited period, becoming most eminent. Now, what was the reason of that? It was because the jeweler, the silversmith, who worked with his hands, was educated, not only as an artist, but an artist of the highest class; and Vasari observes, in the life of Bandinelli, that in those times no man was reputed a good goldsmith who was not a good draughtsman, and who could not work as well in relief. We have a principle then established, that the person who did the material work in the finer works was an artist, who could not only draw, but model and did the same with the metal itself, for that is the nature of that class of work of which I have spoken.

"Now, take the life of Cellini. Here was a man who originally was put to a totally different employment. His father had no higher ambition concerning him than that he should become a great player upon the flute; and he teased him during all the last years of his life because he had no taste for this, and would run after goldsmiths and others, and learn the different branches of their profession. He led the most wonderful life. He was to-day at Rome; next day at Florence; then he was at Naples; then at Venice; then in France; then back again; that he could have done any work, in fact, seems incredible to any one who reads his life. And he did not travel by train or any public conveyance which could take on his luggage. He traveled on horseback, each time, from Rome all the way to Paris. He had no luggage; he was a poor man, and whenever he came and started his shop, he began by making his own tools; and he worked with his scholars, who were generally young men that became themselves eminent in the profession, in a little open shop, looking to the street; there he himself hammered and carved and cast and shaped, and did whatever else was necessary for the work. He was an actual working goldsmith; and the beauty of his works consists in this,

that they have the impress of genius so marked upon them, that they never could have been designed by one person and executed by another. There is as much art in the finish by his own hand, in every enamel, in the setting of every stone, as there is in the entire design; nor does he ever dream of talking of himself in any other way; and yet how he went on from step to step, until at length he produced the most magnificent works, on the largest scale, in marble and in bronze! He describes how he constructed his own Perseus. He went to buy his own wood, and saw it brought; and when he was casting that most exquisite statue of Perseus, which is still one of the wonders of Art, he had every sort of misfortune. His furnace blew up, the roof was blown off, and the rain came in torrents upon the fire just the moment that the metal was going to be poured in. By his ingenuity, his extraordinary contrivances, he baffled, it might appear, the whole chain of accidents and brought out, almost without a flaw, that most perfect piece of workmanship. You may imagine to what a state he was reduced, when, the very moment that the metal was ready for pouring out, the explosion took place. He had no other resource but to run to his kitchen, as he says, and to take every piece of copper, to the amount of two hundred porringers and different sorts of kettles, and thrown them into the fire; and from those that splendid statue came forth. There was genius.

"As a curious instance of the most extraordinary ingenuity, he tells us that on one occasion a surgeon came into his shop to perform an operation on the hand of one of his pupils. Upon looking at his instruments, he found them, as they were in those days, so exceedingly rude and clumsy, that he said, 'If you will only wait half an hour, I will make you a better instrument;' and he went into his workshop, and took a piece of steel, and brought out a most beautifully finished knife, with which the operation

was successfully performed. Now this man, at the time you see him thus working in his shop as a common workman, was modeling in the most exquisite manner in wax; spending his evenings in the private apartments of the Grand Duke, modeling in his presence, and assisting him with a hundred little trifles which are now considered treasures of Art. And so wherever he was, and under all circumstances, he acted as an artist, but at the same time as a truly laboring artisan. It was the same with others in the same profession. He was not the only man, by any means, whose genius was so universal; because we find him telling us repeatedly that the moment he heard of some goldsmith (and in those days a goldsmith was really an artist, as I have already said), who excelled in any particular branch of Art, he determined to excel him. Thus it was that he grew to rival the medals of one, the enamels of another, the peculiar manner of putting foil to precious stones of another; and, in fact, there was not a branch of Art which he did not consider it his duty to excel in. With this spirit, is it wonderful that men of really great taste should have been produced; men who, you observe, looked upon every branch of productive art as really a branch of the higher art of design; and thus in their own persons combined that art with the power of the tool,—were artists as well as artisans?

“There is another celebrated jeweler of that time, whom he mentions frequently, of the name of Antonio Foppo, a Milanese, who is better known in the history of Art by a name which he received in derision in Spain, the name of Capodursa, which means a bear’s face, and which he is known by, commonly, in works of Art. Cellini described to us the processes by which he produces his works; and they are so careful, and require such accurate knowledge of Art, that his knowledge must have been very superior indeed in the arts of design. As an instance of what was the latitude

and the extent of Art, and how really a jeweler or goldsmith in those days was not above work which in our days no one would dare offer to a person of such a profession, we have a case recorded in the history of one of the painters, Pierino del Vaga, by Vasari, speaking of a very particular friend of Pierino’s, a goldsmith. When the Grand Duke of Tuscany was building his palace, he gave to this man a commission to make the metal blinds for the ground floor of that palace (and it is considered a great pity that a work of so comely a nature should have perished, because there can be no doubt whatever that it was a work of exquisite beauty). So that, even upon what would be considered the lowest stage of common production, the artist did not feel it was beneath him to design; nor to give a design to others, but to executé it himself. We have in the collection, particularly of Italy, in the palaces, evident proofs of the great extent to which this combination of various arts must have been carried, in works exceedingly complicated, extremely beautiful, and at the same time necessarily requiring a great deal of ability to execute. Those are the rich cabinets in which may be found, mixed together, work in marble, and in ivory, in wood, in metals, in enamel, and in painting, all combined together by one idea, and all executed by one hand, but of the authors of which it seems impossible to find any good trace. They probably were produced by those men called goldsmiths, and who, as I said before, could work as well upon any of those substances, and thus bring them harmoniously to form one beautiful whole.

“Now, proceeding from what is most precious in Art to what is more homely, let us return for a moment to a subject on which I have already touched. I have spoken of the beauty of the productions of antiquity in metal, which were found in the excavation particularly of those two buried museums, as we may call them, of antiquity, Pompeii and

Herculaneum. The collection of these is chiefly in Naples. Except where presents have been made to other countries, they have been jealously kept together. Now, these different objects have not been dug out of temples or out of palaces, but they have been taken out of every sort of house,—houses evidently belonging to the citizens,—and I think you may see that there is not one in that collection which does not immediately arrest the eye both by the beauty of form and by its exquisite fancy. Many of them have been engraved in the publication called the ‘Museo Borbonico,’ the Bourbon Museum, the Museum of Naples; and I think very justly the remark is made by the editor in the fifth volume, that the whole modern civilized world, however vast it may be, and however it may labor in so many arts and so many trades, does not and cannot exhibit even a small proportion of that elegance and ornament, varied in a thousand ways, and in innumerable most fantastic modes; which are to be admired in the remains of furniture found in Pompeii and Herculaneum,—two cities which occupied so insignificant a place in the ancient world. That is quite true. Now, what are we to infer from this? There can be no doubt, as I have said, on examining these beautiful objects, that they have been for common use. There are scales, steelyards, which can only have been made to weigh provisions; the chains are most delicately worked; the weight is frequently a head with a helmet, most beautifully chiseled; and so genuine and true are these, so really intended for every-day use, that one of them has stamped upon it yet the authentication made at the capitol of the weights being just. This was a steelyard which was in the kitchen, and it was for the ordinary purposes of the house. There are other large vessels which must have served for culinary purposes, and of which the handles and the rings and the different parts are finished far beyond what the finest bronzes that are

made now in Paris can equal. What are we to conclude? You do not suppose these were the designs of the Flaxmans and the Baileys of that day. Who ever heard of a great artist in Pompeii and Herculaneum? And how can you imagine that every house furnished itself with what were considered exquisite and extraordinary specimens of Art for the use of their every-day life? And then, where are their common utensils, if these are not they? If these lamps were not what they burnt, if these candelabra were not the shafts upon which they were hung, if these vessels were not those in which they prepared their viands, where are those? Were they carried away in the flight? But the most precious would surely be carried away, and the commoner be left behind. Nothing of the sort. One may see here everything is to be found; and everything is beautiful in shape, and generally in finish. What are we to conclude? Why, nothing less than that the braziers who made these things were able to make them. They came from the hands of the brass-founder; they have been chiseled in the workshop; they have been finished, not to be put up in cabinets, but in order to be knocked about by servants. Then here we have a state of Art in which the producer, the man who makes, who manipulates, who handles, the object of manufacture which he produces, was able to do what now defies almost our most superior workmen.

“Now let us go to another part of the world, and come to a later period. Nuremberg, during the time which I have specified,—between 1300 and the middle of 1500,—was a centre of Art, and especially in all metal work. There is an observation of Hoffman, a German writer, that Nuremberg was the city in which the artist and the craftsman walked most harmoniously hand in hand; but I think he does not go far enough; he ought to have said that it was a city in which *the artisan and the artist were the most perfectly combined*. At a very early

period, that is, as early as 1355, there was produced a piece of work such as is at this day the admiration of all artists. And what was it? It was a mere well, a fountain in the public square; 'the beautiful fountain,' 'the beautiful well,' as it is to this day most justly called. Now, this was made entirely by the designer, by the artist himself, Höfer, who united in himself these two qualities; and it is acknowledged that in the treatment of the metal work, and in the beauty of the religious images which surround this fountain, but few steps have been made in Art since that time. And he, as I observed, was a mere workman; he did his own work. At a later period,—at what is considered the third period of Art, in Nuremberg,—there is another remarkable piece of metal work; and I am glad to find that in the last report just published by the department of Practical Art, Mr. SMIKE has introduced a letter in which he begs that this piece of workmanship, which he calls one of the most celebrated productions in metal, may be copied by casts, and brought to England as a specimen of Art. Now that beautiful production was of as early a period as 1506; it was made between 1506 and 1519, and it is the shrine of St. Sebald, in his church at Nuremberg; and no one who had seen that exquisite piece of work,—so beautiful, so elegant, as that no iconoclasm had dared to touch it (though I must say that Nuremberg had been preserved from the reproach of that error),—but there it is, in its freshness and its beauty, as it came from the artist's hand; in the centre, a shrine of silver, in which is the body of the saint, and around it what may be called a cage or grating of the most perfect metal work, and with statues of most exquisite workmanship. Now I do wish this to be brought to England,—a copy, that is, of it,—not merely because it will show what was done in ages that we consider hardly emerging from barbarism; not only what beautiful inspirations religion could

give the artist; but because it will show to those who are trying to raise the character of any art *the true principle upon which alone it can ever be raised to what it was then.* They will see the artist portrayed upon it,—Peter Vischer,—they will see him with his apron on; they will see him with his chisel and his mallet in his hand; they will see that he aspires to nothing more than to be a handicraftsman, a workman in metal, who yet could conceive, and then design, this most magnificent production of man's hand.

"Another example, something of the same sort, we shall find in a neighboring country. There is at Antwerp, likewise, a beautiful well near the cathedral; and if you ask who it was that produced this, you will hear that it was one who sometimes had been known as a painter, and at others, under the more familiar appellation of the 'Blacksmith of Antwerp,' as a blacksmith; and there is a piece of iron work which I fear that not our most perfect Works could turn out,—certainly not, nothing that could be compared with it. And Quintin Matsys was a poor school-boy, who, finding the heavy blacksmith's work too much for him, took to drawing and coloring little images of saints, to be given out in processions, and thus rose to be a painter and an artist, finding his first profession too heavy for his strength. But this iron work is a work of Art; it is not a work merely cast in the lump, and then put together; but it is a work that required genius, that required great artistic skill; it shows that the artist even worked in iron; that a man who belonged to the very lowest branch of what may be considered the arts—laboring in metal—was able, notwithstanding, to imagine and to carry out the most beautiful conceptions.

"Now let us proceed to what may be considered a higher branch of Art, and that is Sculpture. We shall find exactly the same principle throughout; all the greatest artist of the most flourishing

period were *men who did their own work*. You are probably aware—many, I have no doubt, are—at the present day, when a sculptor has to produce a statue, he first of all makes his model in clay; probably a drawing first, then a small model, then a model exactly as he intends the statue to be, full-sized and completely finished; from this the cast is taken in plaster; the block of marble of proper size is put beside it, and a frame over it from which there hang threads with weights; these form the points from which the workman measures, from corresponding lines, first to the models, and then from these which are over the cast to the cast itself; and by means of the merest mechanical process he gradually cuts away the marble to the shape of his cast, and often brings it so near to the finished work, that the artist himself merely spends a few weeks upon it. This was so much the case with a very eminent sculptor, that it is well known he hardly ever had occasion to touch it.

“Now, that was not the way the ancients worked; they knew perfectly well that there was more feeling in the few touches which the master-hand gives, even from the very beginning of the work, than there can be in low and plodding process of mechanical labor; and we find that those who were really exquisite sculptors in ancient times *were also their own workmen*. Vasari tells us of Oreagna, that he made at Florence seven figures, *all with his own hand*, in marble, which yet exist. Now, Oreagna was certainly a remarkable person. He was a sculptor, a painter, and an artist; and so justly *vain*, if one may so speak, of this varied character of his Art, that, upon his monuments or sculptures, he calls himself a painter; upon his paintings, he always calls himself a sculptor. His paintings are to be found in the cemetery at Pisa. The most beautiful and splendid of his works is the matchless altar in the church at San Michael, in Florence. This artist, now, whose work

is certainly most beautiful, most finished, as far as we can gather from his life, *actually did the work with his own hands, and carved the whole of the marble himself*.

“I now will mention one who became very celebrated, and from whose life it is evident that he did the whole of carving with his own hands,—and that is Brunelleschi. He lived at the period when Art was becoming truly most beautiful,—the period which just preceded the appearance, perhaps, of a still greater artist, but who, in some respects, departed from the purest principles of Art. He was the contemporary of Donatello, and they were both very great friends, and worked even in the same church. An anecdote related by Vasari, in the life of Donatello, will show us how truly Brunelleschi was not merely a sculptor, but a carver who performed the work with his own hand. He tells us that Donatello had received a commission to carve a crucifix (which yet exists in the Church of Santa Croce, under a beautiful painting by Taddeo Gaddi), and that he produced what was considered a very fine work; but he was anxious that his friend Brunelleschi should see and approve of it. He invited him therefore, one day, to inspect it; which shows that the work had been covered up and concealed during the execution. Brunelleschi looked at it, and said nothing. His friend Donatello felt hurt, and said, ‘I have brought you here to give me your opinion; tell me candidly what do you think of it?’—‘Well, then,’ Brunelleschi said, ‘I will tell you, at once, that it is a figure, not of Christ, but of a peasant or a rustic.’ Donatello was indignant. It was perhaps the most beautiful specimen of the subject in carving that had been produced; and he used an expression which became a proverb; and I cannot help remarking how many expressions of artists have turned into proverbs. The expression in Italian means this: ‘Take a piece of wood, and make another.’ Brunelleschi did not reply. He went

home. He did take a piece of wood. He said nothing to Donatello, and he carved his crucifix. When it was quite finished, he met Donatello, and said, 'Will you come and sup with me this evening?' 'I will do so with pleasure,' said Donatello. 'Then come along;' and Brunelleschi, as they went on, stopped at the market, bought eggs and cheese for their supper, put them in an apron, and said to Donatello, 'Now, you carry these to my house while I buy something else, and I'll follow you.' Donatello entered the room, saw the crucifix, let fall his apron, and smashed the eggs. Brunelleschi soon followed, and found Donatello with his hands stretched out, and his mouth open, looking at this wonderful work. 'Come,' said he to Donatello, 'where's our supper?'—'I have had my supper,' said he; 'you get what you can out of what is left.' And then, like a true, noble-hearted, generous artist, he took his friend by the hand, and said, 'You are made to represent Christ; I, only to represent peasants.' Now, this shows, as I said before, that this poor artist carried on his own work with his own hands, shut up in his own house; in fact, that, as Vasari tells us, he never allowed any one to see it until it was quite completed.

"There can be no doubt, that among all the names celebrated in Art, there is not one that can be put in comparison with that of Michael Angelo; a man, who, not merely from his follower, disciple, and intimate Vasari, but even from jealous, envious and ill-tempered Benvenuto Cellini, receives constantly the epithet of 'the divine.' No man certainly ever had such a wonderful soul for Art, in every department; the cupola of St. Peter's, as an architect; his Moses and his Christ, as a sculptor; and his Last Judgment, on the ceiling of the Sistine Chapel, as a painter,—are three monuments which would have made the eternal fame, not of three, but of a hundred, artists in each department. Great, noble, generous, and though

perhaps somewhat in his temper not amiable, yet sternly honest in all his dealings, he seems to have been the great centre, around which the Art of his period revolved. There was no one so great, so sublime in any particular branch of it, that did not look up to Michael Angelo, and consider him his superior. It is acknowledged that Raffaele went into the Sistine Chapel, and saw Angelo's wonderful works, and changed entirely his style upon beholding them; and it is particularly acknowledged by the writers of that time, that in every other department—civil engineering, etc.—he was considered equally supreme. Now, you would suppose that this man, upon whom commissions poured in every day for great works, would have employed a number of artisans to assist him; that he would have had carefully prepared models, which he would have intrusted to skilful artificers, so as to lighten his labor. But no such thing. There is every evidence we can desire, that, from the beginning to the end, Michael Angelo performed the whole of his own work; that he began with the piece of marble as it came from the quarry; that, if not always, pretty generally, he did not even condescend to make a design beyond a small wax model, but immediately set to work with chisel and mallet on the figure which he had in his imagination, and which he knows was as truly lurking in the inanimate block. Vasari shows us, in fact, from his unfinished pieces, in what way he must have mapped out the marble and done the work himself; and that is why we have so many vast pieces by him unfinished; either the stroke did not come out as he desired, or it went too far into the marble, and spoilt his labor. But so it is, that by far the greater part of those gigantic pieces which he finished, if not all, were the productions of his own hand, as well as of his intellect.

"When about seventy-five years of age, Vasari tells us, he used to be just as indefatigable with his chisel and

hammer as when he was a stout young man. He had near his bedroom, if not in it (for he lived in a most primitive and simple manner), an immense block of marble, and, when he had nothing else to do, he used to be hammering at that; and, when asked why he so continuously worked at this branch of his various arts, he used to reply that he did it for amusement, to pass his time, and that it was good for his health to take exercise with the mallet. He undertook at that age, out of an enormous block of marble, to bring out four figures, larger than life, representing the descent from the cross; and he had nearly worked out the figure of our Lord, when, happening to meet with a vein that was hard and troublesome, he one day broke it into half a dozen pieces. It was seen in this state by a friend, and his servant begged it for him. It was put together, and it is now to be seen at Florence. But Vasari says that it was necessary, in order to give him occupation, to get another large block of marble and put it near his bed, that so he might continue at his work; and he began another group of the same sort. This was at the age of seventy-five. And Vasari gives us an interesting account of how he worked; he says he was remarkably sober, and while performing his greatest works, such as the paintings, he rarely took more than a crust of bread and a glass of wine for his dinner. This sobriety, he says, made him very vigilant, and not require much sleep; and very often in the night he used to rise, when he could not sleep, and work away with his chisel, having made for himself a sort of helmet, or cap, out of pasteboard, and upon the middle of this, in the top, he had his candle, so that the shadow of his body never could be thrown upon the work.

"Vasari tells us an anecdote which is interesting as showing the character of Michael Angelo and of his time. Vasari observes that he never used wax candles for this purpose, but a particular

sort of candles made of goat's tallow, which, he says, are particularly excellent. Wishing to make him a present, he (Vasari) sent to Michael Angelo his servant one day with four bags of these particular candles, containing forty pounds of them. The servant brought them; and Michael Angelo, who never accepted a present, told him to take them back again,—he would not receive them. The servant said, 'They have nearly broken my arm in bringing them; and I shall not carry them back.' 'Then do what you like with them,' said Michael Angelo. 'Then,' replied the servant, 'I observed, as I came to your house, that just before your door there was a nice bed of just-hardened mud; I'll go and stick all the candles in this, and light them all, and leave them there.' Michael Angelo said, 'No, I can't allow you to make such a confusion as there would be about my door; so you may leave them.' This shows the homely and friendly way in which the artists lived among themselves.

"We have a very interesting account of the manner in which he used to work at his marble, from a contemporary French writer, who says: 'I can say that I have seen Michael Angelo, when he was about sixty years of age, and not then very robust, make the fragments of marble fly about at such a rate, that he cut off more in a quarter of an hour, than three strong young men could have done in an hour,'—a thing almost incredible to any one who has not seen it; and he used to work with such fury, with such an impetus, that it was feared he would dash the whole marble to pieces, making at each stroke chips, of three or four fingers' thick, fly off into the air;' and that with a material in which, if he had gone only a hair's breadth too far, he would totally have destroyed the work, which could not be restored like plaster or clay.

"Going now to another part of the world for the same Art, we return to Nuremberg, and find a most magnificent

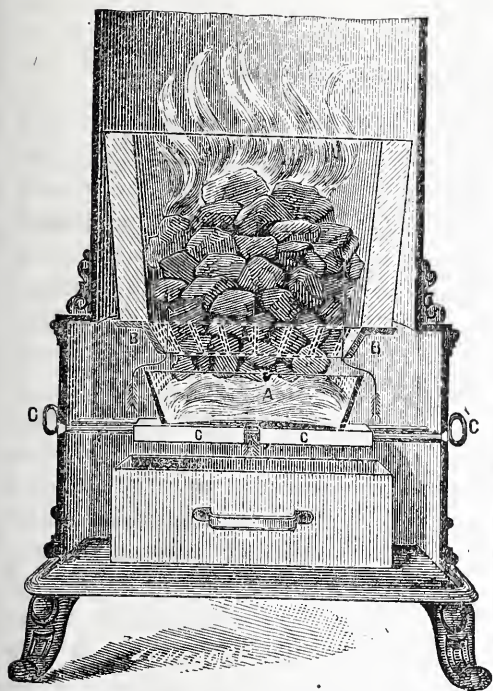
piece of sculpture in stone, unrivaled in the delicacy and exquisite beauty of the work; that is the tabernacle in the Church of St. Lawrence. It rises from the ground, and goes up, not merely to the top of a very high church, running along like a plant, with one of the pillars against which it is built; but, as if the church was not high enough for it, creeping far beyond, and making the most graceful termination, which has nothing similar in works of this sort. So beautiful and delicate is the whole work, representing all the mysteries of our Lord's life and passion, that, for a long time, people used to assert that it was not stone, but modeled in some composition. But it has been proved beyond doubt that it is stone. Now, the man who made this was a mason,—a *common working stone-mason*,—Adam Kraft, who built part of the tower of the church, and whose name is upon it as the mason who built it; and he, until 1490, when he was fifty-three years of age, had never attempted to work as a sculptor; and yet, before he died, he had not only executed many beautiful works, and among them a carved staircase in the tower, but this exquisite work, which is without a parallel. He has represented the whole of it as supported by three kneeling figures, himself and his two apprentices, who executed alone the whole work.

"We see, therefore that wherever there has really been grand or noble work executed by sculptors, *they have been artificers as well as designers; they have done the work with their own hands, as well as imagined it in their own fancies.*"

A SINGULAR WALL.—Walls formed of human bones are not unfrequently to be met with in some of the ancient cemeteries in the South of Ireland. A remarkable one, the remains of which may still be seen, was some years ago in the avenue leading into the Franciscan abbey of Kilcrea, in the county of Cork. This ditch was composed of the bones of the legs, arms, and vertebrae, the

interstices being filled up with the smaller bones. It was about forty feet long, seven feet in height, and six broad. At present these remains have become partly dissolved from rain and exposure to the weather, and covered with moss, nettles, and other rank vegetation. These bones owe the regular order in which they are placed to the following cause: About eighty years ago, an aged woman of extremely weird aspect, and it is said of unsound mind, suddenly made her appearance in the vicinity of the abbey, and after a short time took up her abode in an unclaimed and untenanted vault, which she appropriated to her own use. She always seemed to avoid intercourse with the people around, and though she scarcely ever spoke to any person, yet the hospitable and good-natured neighbors occasionally supplied her with cooked potatoes and a little milk. She was often seen to drink of the Bride, the brook that ripples by the ruin. Seldom seen in the daytime, when darkness set in and silence reigned around, she emerged from her charnel-house, and occupied a considerable part of the night-season in collecting the bones of generations long passed away that lay scattered up and down through the abbey, and arranging them in the order we now find the traces of them in the ditch. The skulls she disposed of in the small Gothic windows of the choir and chancel, the frontal organs looking on the outer world. A more ghastly sight could scarcely be conceived; yet she fitted them in so compactly that one window remained intact till within a few years ago, when, on a stormy night, it was blown in, and these fragments of frail mortality were scattered by the wind. The only tradition that the country people possess of this mysterious woman, is that she came from the North. After living here entombed for two years, surrounded by a vague reputation for sanctity, and much respected, she suddenly disappeared on a Christmas morning, and was never after heard of.

HOUSEHOLD ECONOMY.



A NEW PRINCIPLE IN STOVES.

A DECIDED revolution, largely in the interests of household comforts and economy, is now initiated by Geo. R. Moore, of this city, patentee of a substitute for iron grates in burning coal, in all its varied applications for cooking, warming rooms, and generating steam.

The accompanying engraving shows a vertical middle section of a small cylinder stove, with this improvement applied at the usual place for the grate. The place of draught will be seen where the arrows are shown, and below that an ash hopper (*a*), closed with loose slides (*c, c*). The operation is as follows: The slides are closed, and the hopper (*a*) filled with ashes, upon which the fire is kindled and receives its draught all around the burning column, until the heap of ashes and cinders (*a*) becomes too high and obstructs the draught, then the slides (*c, c*) are operated, and the ashes let down without causing any dust whatever into the drawer below; at which time the fire

and coal above descends, so as to cause the fire to be more exposed to the draught.

It is thus seen that the fire and coal are sustained by an ash bank, entirely around which is a draught of air to assist combustion.

When the invention is applied to a very large fire it is put in, in sections. The inventor claims for it in all situations the following advantages:

That the fire is more easily kindled; that no coal is lost in kindling or poking; that cinders do not accumulate in the fire, as it passes as fast as made to the hopper, where it is discharged; that it is more economical and durable; that the fire keeps better; that it does away with the need of sifting ashes to save coal; that in all cases where it is not desirable to have heat radiated to the ash pit, this method effectually prevents it. It is already applied to boilers, cooking, and heating apparatus. Its cost is about the same as ordinary iron grates; over which its economy and convenience seem to promise it an easy victory.

Such inventions as this never fail to become popular, for the very simple reason that they meet the general requirements of production, to the largest amount, with the greatest acquirable economy, not alone of fuel, but labor in attendance. And when we take into consideration that the cost is no more than that of an article which gives trouble, dirt, and inconvenience; namely, the common grate, we know that its advantage over all rivals is complete. A little attention to the illustration here presented, cannot fail to make the principle of this stove understood, and we doubt not that once its evident merits become known, that it will rapidly come into public favor. Such a thing was very much needed, and we think this invention fills the want in every possible respect.

COMMUNICATIONS.

ARCHITECTURE AND OUR HOMES.

SEVENTY years ago there was no difference between the house of the Virginia planter, and the New England farmer, because both came from the same country, and reproduced the same style of house which they had been accustomed to dwell in, in their fatherland. New York, however, long retained distinctive traces of the Dutch origin of its settlers, while in Louisiana, may still be seen the gloomy quadrangular houses looking like small fortresses, which were first erected by the Spaniards, with their grated windows and heavy batten doors. The French also left numerous traces of their national taste in the houses erected when they took possession of that State; but none of those buildings were adapted to our climate, or the wants of our people, and as this is too apt to be the case in the light of the present day, let us enumerate the considerations involved (in our opinion of vast moment), in the adaptation of our homes to climate as well as to our wants and requirements. In the first place to design such a residence, suitably arranged, combining all the required comforts, taking all the advantages of the situation and its surroundings, is a most difficult task for the Architect, no matter which style may be chosen, whether it be the Grecian, Italian, Castellated, English, Swiss or French. In each case the outer form should always be selected with great care and with the finest outlines, and the form of the plan should combine the owners requirements as to comfort in the location of the different rooms, taking into consideration, light, heat and ventilation, and an easy and full supply of water to each story, as on these chiefly depends the health of the inmates. A harmony of colors should

exist both externally and internally, with the spirit of life pervading the whole structure, and here permit the suggestion that those about to build should always employ a competent Architect to furnish the necessary plans, specifications and working drawings, and place them in the hands of competent mechanics to execute the work.

A thorough knowledge of the expense and labor, in the erection of an edifice, is absolutely essential to a builder who does the work by contract, and which cannot be obtained unless complete plans and specifications are furnished him. Without these he is liable to imposition by the proprietor, who is even more ignorant on the subject, for he provides himself oftentimes by schemes and descriptive language with landmarks, within the range of which he knows he can proceed with safety to his own pocket to make a contract with the builder who is anxious for "a job." Such a contract often brings ruin on the half informed builder, and the sordid speculator sometimes sleeps sweetly in a comfortable mansion, erected by the sweat and substance of the robbed artisan.

It is an encouraging fact that in almost every part of our country, the eye and heart is gladdened by evidences of the growing tendencies of the age to equalization of condition. America is the home of the poor man as well as the rich, where he can acquire, by industry and frugality, a beautiful house, which every father who has any care for those dependent upon him should and may possess.

In a newly settled country the buildings are necessarily rude and inconvenient; hence the log cabin, as it is the most easily constructed of all quadrangular

houses, was used by the first settlers of this country, and its use is continued by the pioneers of the present day. This is the earliest style of rural or home architecture, and shows the distinction between civilized and savage life, which the traveller sees as he journeys "westward ho," on the iron horse, whose destination is the "Land of the Setting Sun." As this great propeller of civilization advances, more comfortable abodes are furnished. The log cabin is removed to make way for the cottage, villa or city mansion. A cottage indicates a disposition in the proprietor to live within his income, and as the poet truly said, "If there's peace to be found in the world, a heart that is humble might hope for it here."

A villa indicates the proprietor to be well-to-do in the world, and one who loves the beautiful, having the surroundings to correspond with the building. This often times indicates the character of the owner, and with the internal fixtures, is an index to his mind.

A mansion is such a structure as is designed only for the wealthy, and no prudent man will invest his means in such a structure unless he has an income sufficient to run such an institution. He should bear in mind that "fools build large houses and wise men live in them."

Suburban and rural architecture give a wide field for the introduction of every style of building, and in no country are they carried to a greater proficiency than ours, for we have every variety of climate and location necessary to give them their proper effect. The English, Swiss, and Castellated styles are well suited to our northern and mountainous regions. The French to our rolling prairies, and the Grecian and Italian to the Sunny South.

There is no country on the globe that has more beautiful rivers and prairies than ours, on and along which, are already found cottages and villas built after every style of architecture.

In selecting a site for a suburban

residence, great care should be taken, as on this, health depends. It should be on elevated ground, having an eastern and southern aspect if possible, because it has the greatest amount of sunshine, hence more heat, and the adjacent soil dries more readily than in any other. The north never has full sunshine, hence it is the coldest, and the soil requires the longest time in drying; eastern and western aspects have a medium between the two former, and are desirable when the southern cannot be obtained. Swamps and stagnant ponds should always be avoided, or guarded against in the selection of a building site. In our western country, low situations should always be avoided on account of fogs and humidity; and very high ones, relatively considered, are found to be less salubrious than those of a medium elevation. Trees are very desirable around a building for their shade, but should not be so thickly planted as to produce dampness, nor so situated as to prevent a distinct view of the edifice.

The Grecian style of house is well adapted to our climate, and is known by its uniformity of outlines, its square headed windows and Grecian porticos with flat roofs.

The English style has three modifications, viz: Early English, Tudor and Elizabethian. The first is characterized by gables and pinnacles, the next by the Tudor arch, oriel windows and dormers, and the third by bay-windows, hip-knobs, and horizontal hoods. This style of architecture is very graceful, and is well adapted to countries where they have much snow and rain, the roof being acute so as to shed water very readily.

The Italian style is well adapted to many parts of our country, and is known by the absence of acute gables, buttresses, embattlements and clustered columns. Instead of these are found: the hip-roof, in place of the gable or pediment; the pilaster, instead of the buttress; the balustrade instead of the battlement; the semi-circular arch instead

of the square-head. The balcony verandas, and projecting roof with brackets, are the most prominent features of this style.

The Castellated style is known by having towers crowned with embattlements and turrets; their windows divided by mullions, with transomed doorways, heavy and deeply recessed. This style is adapted to a rocky country along rivers. In feudal times it was used for strongholds.

The Swiss architecture is noted for its picturesque beauty, and not for its proportions, or its especial adaptation to the climate of Switzerland. A cottage built in this style, as it stands amid the embowering trees of some mountain gorge, produces feelings of admiration and delight to the beholder. This style is only adapted to a mountainous or hilly country. Its principal features are the projecting roofs, which sometimes extend ten feet beyond the face of the building, requiring heavy stones placed upon them, to prevent the wind from capsizing them. Galleries supported by large brackets, and sometimes splayed gables are used.

The French style of architecture is very graceful in appearance, presenting regular, irregular and curved outlines in the general plan. Its roofs are Mansard, with curb cornice or band; also with ornamental railing. The roofs are pierced for dormer windows of various forms. Their cornices are light and supported by brackets. Quoin blocks are generally introduced instead of pilasters. Corinthian or other ornamental columns are generally used in their porches and verandas. This style is well adapted to a rolling prairie, to country or city residence; and has already become a favorite among us. The great advantage of it is, that a full story is obtained in the roof, giving height and character to the structure which no other roof will afford.

The color of a building is one of its main features; and when parti-colors

are used harmony should exist, for, without it no building can show to advantage, or produce a pleasing effect.

In our western country we find the greatest number of buildings painted white, and fitted with green blinds. In cities and villages many of these buildings partake of a rural character, standing isolated, many having ornamented grounds surrounding them. Hence the colors should be carefully varied, often cheerful and light, sometimes neutral, seldom dark, and never white or black. The principal walls should be of some agreeable shade or color; the trimmings, veranda, and other projections, being either of a different color, or a different shade of the same color, that a contrast, not a harsh one, may be established. A third tint, not widely different from the other woodwork, should be applied to the solid parts of the Venetian blinds; while the moveable slats should be painted a much darker tint; for, the effect of a glass window, or opening in a wall, is universally dark when viewed from a distance. And, if this natural fact be not borne in mind, and the shutters are painted the same color as the rest of the house, a blank and uninteresting effect will be produced. In some cases house painters themselves show a laudable desire to escape from a monotonous repetition; but, in most cases there is a desire to avoid the labor of mixing colors, as it requires more skill and judgment than many of them possess; hence the uniformity of color in our western houses. The Architect should always be consulted with regard to the color of the building he has designed; for, much of the pleasing effect depends on such details.

Badly laid roads, and ugly houses are troublesome things to alter, but an improved taste may readily satisfy its cravings for harmonious color, which will give a most liberal return for the outlay judiciously bestowed on it, in the amount of pleasure it affords.

Light in a dwelling is far more im-

portant than many would suppose in producing a cheerful state of feeling. The absence of it has a wonderful effect on the mind, which is often felt when we are deprived of the genial rays of the sun for only a few hours, on a cloudy day.

Natural light in a dwelling is generally obtained through windows, which should always be so constructed in a warm climate, as to give the greatest volume through the smallest aperture, as glass draws the heat, and renders the apartments uncomfortable. In countries where the sun has little force, and where the winter is cold, the windows should be of larger dimensions, so that all warmth and light may be admitted which the sun can yield. A large lofty space requires a greater quantity of light than one circumscribed in its dimensions; and art demands that the quantity introduced should be so regulated that it may excite joyous, cheerful or solemn sensations in the mind of a spectator, according to the nature and purpose for which the apartment is intended.

There are many different modes of heating dwellings. In olden times fire places were sometimes constructed of a large capacity, sufficient to receive a small saw-log. This was a very good mode in early days, when wood was more plenty than at the present time. It also furnished light sufficient for our old mothers to spin their yarn, and do their knitting. These old fashioned chimney places were good ventilators, drawing from the floor all impure air, receiving cold air through doors and cracks of their poorly constructed dwellings. This rendered the inmates healthy and made the old adage true, "That cold buildings are generally healthy ones." Heating rooms by stoves is no doubt the most economical mode for small dwellings. Heating by hot-air furnaces is a system used in many large dwellings. The great objection to furnaces is the difficulty of sending the heated air

through horizontal pipes which are required in most dwellings. The rooms directly over the furnace receiving all the heated air, while those more distant are receiving none. Another great objection to furnaces, whose radiating surface is sufficient to produce heated air for a large room, is that they are great consumers of fuel, which is an item in economy worthy of consideration. One advantage the furnace has over the stove and grate, is the freedom from dust.

Steam, for heating large buildings, no doubt is the best mode. It is a modern invention, and has been brought to great proficiency. This kind of heat produces a much pleasanter warmth than either of the other methods.

In point of economy, heating by steam is desirable, as a boiler will not require more than one third as much fuel as either of the other methods, to rarify the same amount of atmosphere, and require only the attending of one fire. This is certainly an important consideration especially in our prairie country, where fuel is so high and scarce.

Good ventilation is also necessary to health. There are but few who understand its great import. A good system of ventilation can be accomplished with very little expense, by forming flues in the walls and chimnies, through a perforated base, or registers placed near the floor, admitting pure air through apertures within a few feet of the ceiling, or by dropping the upper sash a trifle. This is a simple and cheap mode. Many other artificial modes are used, but they are very expensive and are better adapted to public buildings.

A good supply of pure water can never be too highly prized; it is very important to health and comfort, and should in all cases be secured in the selection of a site for building. In the absence of springs, which are natural fountains of pure water, a well or cistern will supply its place.

It is estimated that one hundred square yards of roof will afford 18,700

gallons of rain water annually, and by filtering it good pure water can be obtained from the roof. The water thus procured is free from mineral substances, which fact renders it more healthy, and at the same time leaves it soft enough for washing purposes. Each story of a house should have a sufficient supply of good water. In places where no public water-works exist, the upper stories can be supplied by means of a force pump attached to the cistern. If from a fountain, by a hydraulic ram, brooks, creeks and rivers, never afford good water for family purposes; they usually contain more or less of the dissolved material which is incident to water passing through the upper strata of the earth, and the impurity which is apt to accumulate in flowing over the surface, is often the cause of producing diseases, and such water should never be used when it can be avoided, especially in southern latitudes.

All surplus water around a building should be carried off by means of drains put down low enough to draw off the water from the foundations of the building. They should be led into sewers or creeks, and should in all cases have a stench-trap in them, to prevent all effluvia which may arise therefrom.

It is pleasing to see a growing appreciation evinced by our people, for making home attractive; it certainly should be the most so of all others, the most charming spot on earth, and when we see homes beautified with winding walks, curtained with lofty shade-trees, and adorned with plants and evergreens, what feelings of delight take possession of us, and make us wish that such a home might be ours. Such homes always create a love for the true and beautiful in art and nature, and produce pleasing associations which last a life time.

B. S. D. F.

THE MICHIGAN LUMBER PRODUCT.

PHILADELPHIA, MARCH 5, 1870.

EDITOR OF THE ARCHITECTURAL REVIEW.

DEAR SIR: AS I furnished you with the statistical information concerning the Michigan Lumber trade of 1868, I thought you might deem it of interest to your readers, to publish similar statistics for 1869, and in that view, I have collected the facts and figures contained in the accompanying paper.

Respectfully, yours,
F. H. WILLIAMS.

The statistics of the lumber trade of Michigan, and more especially of the Saginaw Valley, for 1869, give evidence of continued increase in manufacture, and show no falling off in per centage as compared with the increase of former years.

The following is the aggregate of lumber, cut on the Saginaw river and

tributaries each year for the past seven years.

	<i>Feet.</i>
1863.....	133,500,000
1864.....	215,000,000
1865.....	250,639,340
1866.....	349,767,884
1867.....	423,963,190
1868.....	457,396,225
1869.....	523,500,830

By which it will be seen that the increase has been not only large but steady.

LUMBER BUSINESS OF THE SAGINAW VALLEY FOR 1869.

Total number of Mills.....	83
“ “ Mulay Saws.....	61
“ “ Circular Saws.....	77
“ “ Gang Saws.....	59
Total number of Saws.....	197

Capacity.....	626,884,841
Capital.....	\$ 3,754,000
Lumber cut in 1869.....	523,500,830
On hand unsold.....	78,805,614

On dock, sold.....	14,528,000
Logs in boom.....	40,295,437
Men employed.....	2,909
Lath cut.....	51,754,221
Lath Shipped.....	43,780,471
Lath on hand.....	8,519,400

The following estimates are made of the lumber manufacture of the entire State of Michigan, for the year just passed:

Saginaw Valley proper.....	528,500,830
The Shore (exclusive Cheboygan).....	116,815,333
Cheboygan.....	23,000,000
Genesee county.....	91,127,713
Tuscola county.....	11,100,000
Gratiot and Isabella.....	19,930,000
Huron county.....	40,000,000
St. Clair county.....	51,000,000
Lapeer county.....	22,000,000
Sanilac county.....	14,500,000
Detroit.....	55,500,000
Muskegon.....	419,330,555
Ottawa.....	225,000,000
Oceana.....	85,000,000
Mason.....	65,000,000
Manistee.....	125,000,000
St. Joseph, Holland, South Haven, Grand Traverse, etc.....	30,000,000
Upper Peninsula.....	80,000,000
	1,999,804,431

By which it appears that the Saginaw Valley manufactures considerably more than one fourth of the entire product of the State.

From the regular annual statement of the resources and business of the Saginaw Valley, we clip the following remarks concerning

MICHIGAN PINE LUMBER.

"To make a mathematically correct estimate or calculations in regard to the lumber business of this State is, of course an utter impossibility, but approximations may be made based on experience, surveys, and circumstances that, in the main, are substantially correct, and answer the purposes designed. A writer in the *Detroit Post* recently gave a thorough review of the lumber interests of the State, based on calculations made at this point, which is by far the best article on this subject that we have seen for years, the language of which we adopt in the main, making such alterations as, in our judgment, are correct.

" 'Michigan,' says the writer, 'embraces a large number of highly important interests, including some which are peculiar to few other States. With prompt deference to other interests, it will not be denied that the greatest of all of them moneywise, as well as the most magnificent in its general aspect, is that of Lumber. In this respect, probably, no other region of similar extent was ever so richly dowered by nature. Of the Lower Peninsula, embracing some 25,000,000 acres, about one-half may be called a pine region, for the pine timber of the State grows upon all the streams, and is interspersed in almost every township with hard wood. It is a well known peculiarity that the choicest pine is always interspersed with other timber, and that a large proportion of the land is well adapted to agricultural purposes. The most extensive and valuable lumber region is that lying upon the waters debouching into Saginaw Bay, and extending to the upper Muskegon, and thence west to Lake Michigan, covering the waters of the Pere Marquette and Manistee. The Thunder Bay region also embraces a large area of pine timber, and the Au Sable River of Lake Huron penetrates the large central pine country on the head waters of that stream, and on the Manistee and the Muskegon. The last-named stream, with its numerous tributaries, forms one of the chief lumbering districts of the State.'

"The extent of the territory that produces pine timber suitable for manufacturing is much larger than has been generally supposed. It is probable that there are from six to eight million acres upon which pine timber grows, but a very large proportion of this territory is sparsely timbered, and much of it a few years since would not have been classed as pine timbered land. During the past few years explorations have been made in every portion of the State, and parties have located every available tract of pine so far as discovered, taking at Government prices lands which in some cases

will not yield 1,000 feet to the acre. In the Upper Peninsula embracing about 10,000,000 acres, there are probably 8,000,000,000 to 10,000,000,000 feet of pine timber, of which 2,000,000,000 have been already cut.

"About the time the Northern Pacific Railroad Convention was held in East Saginaw, Hon. John F. Driggs prepared an elaborate statement of our lumber, salt, iron and copper interests, in which he says: 'It has been ascertained that in the year 1868 there was cut, in the entire State, 1,600,000,000 feet. Saginaw Valley and the Bay Shore producing about one-third of the whole amount. Making what I suppose to be a low estimate, that the *annual* production in the whole State, in the last eighteen years, has been 400,000,000 feet, the entire product within that period has been 7,200,000,000 feet. Placing the average yield at 3,750 feet to the acre, and at 300,000 feet to the 80-acre lot, we find the enormous number of 1,920,000 acres from which the pine has been removed in this State. Estimating the entire amount yet standing in Northern Michigan, including the Upper Peninsula at double the amount, say 4,000,000 acres, the future yield will be 15,000,000,000 feet, and at the present price of \$15 per M, will be worth in market \$225,000,000. The timber, shingles, etc., will bring at least \$75,000,000 more, making the pine in the forests of Northern Michigan produce the vast sum of \$300,000,000. This 4,000,000 acres of standing pine, at the present rates of exhaustion, will all be cleared in 12 or 14 years. But as heretofore, the pine has been mostly cut on streams accessible for running logs, and as much of the remaining timber, both in the lower and Upper Peninsula, is found in sections too distant from the water-courses to make them available for that purpose, the supply from such localities must depend upon future railroads and other facilities for transportation to market. Until such means are afforded, the annual yield

must soon be diminished, and this may prolong the entire exhaustion of white pine in the State for a period of eighteen or twenty years; but beyond that, it is hardly possible.'

"The pine timber in both the Lower and Upper Peninsulas is held to a great extent by lumbermen and capitalists who are able to hold the timber until it shall be required for lumbering purposes. The amount of Government lands yet remaining unsold may be estimated at about one million acres in the Lower and about one-third more than that amount in the Upper Peninsula. Vast purchases have been made from the Government, of lands technically called pine lands, and the home entries have been very large in this State within the past four or five years. Explorations recently made on an extensive scale have developed the fact that even the farming lands, where but little pine is found, have been extensively located. The estimates of vacant lands, do not, of course, include the Indian reservations.

"Our object in referring to the above facts has been, in part to convey the idea of the progress now being made in the development of the resources of the State, and to show that, rapid as has been the settlement of the upper portion of the Peninsula, the ratio for the next few years must show a decided increase. The advancement in manufacturing enterprises is more than keeping pace with the possession of the land by actual settlers, in numerous instances accelerating the latter movement by its quickening influence. A little more than one decade ago, in all the important region around Thunder Bay, no clash and clanging of machinery, rendered back music to the merry whistle of the passing steamer, yet there are now in that immediate vicinity no fewer than thirteen important manufacturing establishments. The settlement of the Au Sable is much more recent, yet its lumbering operations are already upon a very extensive scale, which will be rapidly augmented, that

point commanding the lumber trade of a most important region. Taking a circuit for a moment around to the Straits of Mackinac, we find a large lumbering interest already in possession of the timber lands of the Cheboygan river, and increasing its business and enlarging its manufacture every year. The Thunder Bay region has also grown very rapidly into large proportions as a manufacturing region.

"Saginaw Bay and river and their tributaries drain a very large area of country, and with railroad facilities increasing every day, and the extensive water facilities of these numerous rivers, the importance of this region can hardly be estimated. The rivers of Lake Michigan, the Grand river, Muskegon, White, Pere, Marquette, Au Sable and Manistee, are all important lumbering streams. These various rivers, it will be seen by reference to the map, penetrate every part of the State, and yet there are large districts of timber which will be more easily accommodated by the railroads which are now pointing to, and pushing into the interior portions of the State."

From a detailed statement, (which has been furnished us, but which we are unable to publish on account of its length), of the operations of the eighty-three different mills in the Saginaw Valley, we learn, the capital employed ranges from ten to three hundred thousand dollars; and the different capacities from one to twenty five million feet per annum. That one mill with two gang, one circular and one mulay saws, operated by capital of \$80,000, and employing sixty men, manufactured during 1869, 13,000,000 feet of lumber and 2,500,000 lath. Another with same number and description of saws, operated by capital of \$100,000, and employing seventy-five men, manufactured in the same time 2,500,000 feet of lumber and 1,630,000 lath. And still another with same number and kind of saws, employing one hundred and sixty men, with capital of \$300,000, manufactured in the same

period, 29,400,055 feet of lumber and 3,994,000 lath, having 3,000,000 feet of logs in mill-boom at end of the year.

One mill with one mulay, two circular and three gang saws, a capital of \$200,000, and employing one hundred and twenty-one men, manufactured during 1869, 23,447,695 feet lumber, and 5,007,000 lath, having 4,104,337 feet of logs in boom at close of season; while another mill with only one saw (circular), employing twenty men and a capital of \$14,000, manufactured 2,285,000 feet of lumber and 450,000 lath, and having on hand in mill boom 3,000 feet of logs.

From the above examples, a fair average it is thought can be obtained of the business of lumber manufacturing in that district.—[Eps.

The following is a statement of the number of shingles manufactured, etc.:

Manufactured in 1869, 119,843,500; men employed, 527; capital invested \$295,500.

ASTRONOMICAL EXPEDITION.

THE Congress of the Argentine Confederation, South America, has passed an act establishing a national observatory. Dr. B. A. Gould, the distinguished astronomer, of Cambridge, Mass., has been invited to organize it and become its director. He will have four assistants, and expects to sail the coming June, and at once enter upon the discharge of his very important and interesting duties.

This scientific movement has been mainly established through the influence of Sarmiento, the President of the Republic, who is a very accomplished man, a true friend of science and education, and the foremost statesman on the South American continent.

A very full catalogue of the stars of the southern heavens will be the first great work to be accomplished by Dr. Gould, and his corps of assistants, which is a performance of great labor, but of great scientific importance, and will be a

worthy monument of the able astronomer whose name it will bear.

The observatory will be situated on a high bluff overlooking the city of Cordova, and the Rio Primero (First river) and the narrow, beautiful valley through which it flows.

The city contains nearly thirty thousand inhabitants, and is the seat of the oldest university in the New World, having been founded by the Jesuits long before a white man trod the soil of Pennsylvania.

It is situated two hundred and sixty-seven miles northwest from Ronario, a seaport on the Parma river, with which

it is connected by the only railroad in that part of the world.

The whole scientific world will take a deep interest in this expedition, and its results will no doubt enrich and advance the noblest and highest of all the sciences—astronomy.

March 17, 1870.

The above communication from our friend, Miles Rock, C. E., who will accompany the expedition, will doubtless be of interest to many of our readers, and we hope to hear further accounts from this purely scientific "excursion," when they have arrived in that distant land.—[EDS.]

WORKS OF ART AT WASHINGTON.

A CORRESPONDENT of the *New York Tribune*, speaking of the proposed statuary for the pediment of the southern wing of the Capitol, says: It is time that some national commissions were given to our best artists—men whose native genius and long years of patient, heroic study and labor have won reputations not confined to their native land, which in many cases has proved to them but a niggardly patroness, a sorry stepmother. I will not ask the contract for this "big job" for Miss Hosmer or Miss Stebbins, as Congress is not up to the justice of paying equal wages for equal work, except, indeed, when the woman be exceptionally young and pretty, but I should say give it to Palmer, an artist of thoughtful genius, long experience and careful study. It would be no experiment with him. Twelve or thirteen years ago he modeled a group for one of these very Capitol pediments, representing the "Landing of the Pilgrims," noble and beautiful in spirit and design; but the artist's time was too valuable for lobbying, his works being in great and constant demand at home, and he failed to obtain the commission. Or, let it be

given to J. Q. A. Ward, an eminently manly sculptor, with the genius to conceive and the thorough artistic knowledge to execute a group for that pediment, which we should all be proud to look up to.

It does not seem to me necessary to have anything allegorical or ideal in such a group. There is surely enough that is heroic, tragic, pathetic, and sacred in the history of our last ten years to furnish real life scenes to both sculptor and painter. We have enough of allegory and poetic license in Persico's sprawling groups, in the dreadful *War* and more dreadful *Peace* of the eastern front of the Capitol—in Greenough's Washington, appealing to Heaven and the Dorcas Society, and in those resplendent frescoes of the Rotunda, wherein the Father of his Country, all in lilac and gold, is represented in a sort of Mohammedan apotheosis, among the Houris—made to sit forever with the girls, like a naughty idle school-boy who doesn't repent. Ah, could that brave, simple country gentleman come back, and see himself thus disposed, and draped, and what is called "idealized," would he like the picture?

The group that is wanted for this pediment may be as poetic, as real, in character, but it should be something dignified, decent, and distinctly American.

The works of J. Q. A. Ward not only exhibit strength and originality of genius, but, without resorting to clumsy allegory, are typical and rational in subject and spirit. His *Indian Hunter* is not only a great artistic achievement, it is the most purely American piece of statuary yet executed in this country. A copy of this in our Capitol would demonstrate even to the most inartistic that there could be power without colossal proportions, and strength without ponderosity. One would suppose that most of the sculptures here had been executed by contract, at so much a tun. Indeed, these marbles would have been far preferable in the simple, placid form of panels and pillars than in such wretched distortions and abortions of art as now disfigures the Capitol.

The French Government appoints an Art Commission, made up of eminent *connoisseurs*, and, on their judgment, secures to itself the choicest products of French genius. Our Government buys at twice the value of real works of art, the huckstered and lobbied monstrosities and imbecilities of daubers and stone-cutters. * * * * *

I am told that there is in Albany, in some hall or club-house, a fine painting by the great French marine artist Isabey, representing Perry's Victory. That picture—so runs the story—was ordered more than twenty years ago by Congress, but some informality in the commission allowed that honorable body to repudiate the bargain. The subject rendering the picture almost unsalable in Europe, the artist was obliged to dispose of it here, at a great sacrifice. Since that time, as you know, everything of Isabey's has increased in value; so our Government lost something besides honor in the transaction. Why cannot we have some of the masterly

portraits of Ames and Page for the Capitol, the White-House, and the State Department? Why cannot we have in the now vacant panels of the House of Representatives landscapes and marines by Church and Bierstadt, and by our Philadelphia painters, Rothermel and Hamilton? The pictures of Mr. Hamilton are almost peculiarly the luxuries of rich Philadelphians; they are not known as they should be known elsewhere—certainly not in Washington. Nature left out of him, as she leaves out of most poetic artists, the pushing, lobbying, bar-gaining element. A few of his pictures have been purchased by *connoisseurs* of New York and Boston, and a few have gone to London, where they are greatly admired, his water colors especially. Mr. Dickens took home one of his marine views—"What are the Wild Waves Saying"—which, I hear, now hangs in a place of honor in the charming library of Gad's-Hill-Place. There is one picture by Mr. Hamilton which would show grandly in the Capitol. It is a large sea view by moonlight—a vivid and tremendous scene, representing the capture of the Serapis by the Bon-homme Richard, commanded by that indomitable sea-lion, that half mythical hero, Paul Jones. The French ship dismantled, riddled, and burning, is belching out fire and smoke, crimsoning the crests of the waves and the white moonlight, and painting the clouds with a fearful glare.

The flames seem to me to be of a peculiar ghastly red, as though colored by the blood they have licked up from the steaming deck. This picture has an absolute historic value, and ought to belong to the nation.

THE *New Era*, Stevenson, Alabama, says:

A brickmaker is badly needed here. We have the best of clay and sand, and cheap labor in abundance.



EDITORIAL ITEMS AND CORRESPONDENCE.

OUR PLATES.—We were so unfortunate as to have two plates, intended for last month's issue entirely destroyed, the original one, too late to re-engrave; and after going to press,—the announced substitute (the latter by a slight conflagration in the office of the engraver). However, we are at the present writing again in order to issue our monthly parts regularly, and we hope our subscribers, under the circumstance, will pardon the tardy appearance of the March number. This will also explain to transient readers the transposition of frontispieces, in this and the previous number.

THE schedule of charges as established by the American Institute of Architects, which we present with this number is left loose that it may be kept for reference, and professional men will, we think, find it worth framing for the information of clients.

WE have received photographs of the Orphan Asylum to be built in Augusta, Ga., the engraving of which will appear in the REVIEW in due season.

THE attention of the public is called to the article of our correspondent on "Architecture and our Homes." It will repay a perusal.

IN the Pennsylvania Legislature, on March 14, Mr. Elliott introduced a bill relative to mechanics' liens, providing that when buildings are erected by con-

tract, the building and ground shall be liable to the contractor alone for work done and materials furnished. When the contractor neglects to pay the persons employed by him, it shall be their duty to notify the owner in writing, and the owner shall thereupon retain so much of the amount due from the contractor. A most righteous bill, and we sincerely hope it may be adopted, not only by Pennsylvania but every State in the Union.

GAS CONSUMING HEATERS.—Reynolds & Son manufacture them.

VERILY "of making many books there is no end." We are led to this (not original) reflection by the lately lengthened list of specialistic journals. Chicago joins the ranks with *The Arts*, an eighteen page quarto, with its title illumed by the countenance of Alex. Von Humbolt, a fair signature of its liberal specialistic principles as laid down in a most reasonable prospectus. It is to treat principally of Agriculture, Chemistry and Physics, also of new inventions, and every novelty and improvement in the arts, and will be a record of scientific discoveries indispensable to the scholar, the artisan or the intelligent household.

The editor, Mr. J. M. Hirsh, Ph. D., is assisted in the first number by able contributions from prominent scientific writers of the day,—Prof. Gustavus Hinrichs, J. W. Foster, LL. D., Prof. Chas. A. Joy, and others.

NEW YORK sends us the first number of *The Technologist*, especially devoted to engineering, manufacturing and building. It is a minor folio of thirty-six pages of reading matter, among which we find much that is interesting and valuable. We have an article from one of the editors on "The Tempering of Steel," which disapproves of the use of all peculiar mixtures in the process; gives the result of some few experiments, and promises further results in future.

He says truly that "the extent to which steel is now used in the arts, renders it exceedingly important that the principles involved in the methods of working and tempering it, should be fully and thoroughly understood," and we shall await further elucidation of the subject with interest. "Recent Improvements in Distilization" is illustrated and discussed by Mr. E. Vassnack, and "The Walks of New York Central Park," by the Superintending Engineer, Mr. W. H. Grant, with cross sections, showing principles of drainage, is particularly interesting. There is also a very fine illustration of the East River Bridge Caisson, showing its construction, and mode of operation. In the building department there is pictured a very plain dwelling with the sonorous title of "Suburban Residence," but with that we can find no fault as it is, in this day, so commonly misapplied. Another feature consists in a department devoted to "Insurance," in which the editor shows the relation of that subject to Technology, and presents correspondence, etc., on the subject; although the last five or six pages are entirely given up to business notices, we think the publication fully worth the subscription price (\$2), and wish it a long and prosperous existence.

NEWARK, N. J., sends us No. 1 of the *Manufacturers' Gazette*, a spirited quarto, at fifty cents per annum.

Other specialistic publications are as follows: *The Hub*, a journal particularly for the carriage builders, which is exquisitely printed and filled with valuable information. It is published at Boston, by the Riverside Press, which of itself is a recommendation.

We also have the *Watchmaker and Jeweller*, devoted to the interests of that trade as signified in its title. *The Printers' Circular*, which appears in a new face this month, and of which we can only say, as heretofore, it is well edited, and a model of typography.

The American Educational Monthly contains many articles on systems of education, which are interesting to the community at large; we especially recommend the reading of "Systematic Technical Education," which is, as far as it has been carried, a thorough treatise and promises well for its continuance.

There are many able and well conducted agricultural journals sent us, a review of which would be impossible in this connection, but which are all doing good service in the cultivation of a taste for rural architecture.

Hearth and Home is one of the best of this class, in fact the designs given in this publication are decidedly better than some professedly devoted to the art of building. It is a journal we have no hesitation in placing among the best of all classes in this country. Its editors are distinguished writers, and its publishers spare no pains to keep up an elegant appearance, that shall vie with the good taste of its contributors in those refining influences, which are inseparable from works of art, be they statuary, prose composition, or the handiwork of the printer. Those of our readers who have not seen this journal we would refer to the publishers, Messrs. Pettingill, Bates & Co., 39 Park Row, New York, and can assure them they will not be disappointed in our recommendation.

We must also compliment *The Horticulturist*, on the very neat design of "country house, with conservatory," it presents this month, as well as on its acquisition of Mr. Shirley Hibberd of the *Gardner's Magazine* London, to its list of contributors. His style is conversational and easy, and his letters will be another attraction to the readers of that journal. Mr. H. T. Williams, its proprietor, is doing much to perpetuate the fame it acquired in the hands of Mr. Downing; and to all interested in the culture of fruit and flowers, we recommend this periodical. It is published at 7 Murray street, N. Y.

More nearly concerning our own interests, we have the *Canadian Builder*, conducted by Mr. Thos. Dyas, P. L. S. and Architect, London, Ont.; *Engineering*, conducted by Zerah Colburn, London, England, probably the best publication of its class in the world. *The American Artisan*, one of the best edited journals in this country, devoted to Arts, Mechanics, Manufacture, etc.; and the *Scientific Press*, from San Francisco, California, an exceedingly interesting journal devoted to Mining, Farming and the Industrial Arts.

We have also received a pamphlet entitled *The Identification of the Artisan and Artist, the Proper Object of American Education*, and have taken the liberty to quote from its pages in the present number of the REVIEW. The subject is one of so wide application we trust that the short extract given in our pages, will have the effect of exciting interest, and all will be anxious to read the pamphlet in full. It can be obtained of Adams & Co., 25 Broomfield street, Boston, Mass., for fifteen cents. The compiler, Elizabeth P. Peabody, deserves the thanks of American mechanics for thus bringing within reach of all this most excellent address of the great Cardinal Wiseman.

Another pamphlet, *Earth Closets and Earth Sewage*, has been sent us from the Earth Closet Company. This subject is attracting much attention among sanitary reformers and others just now, and the system has endorsements of high standard. It is exhaustively and clearly treated of in the pamphlet before us, which is well worth reading, and can be procured from its publishers, The Tribune Association, 154 Nassau street, New York. Price 50 cents.

WE were pleased to receive, from Mr. Samuel Hannaford, the By-Laws of the Cincinnati Chapter of the American Institute of Architects, organized January 25, 1870. Its officers are: President, Jas. K. Wilson; Vice Presidents,

Jas. W. McLaughlin and William Walter; Treasurer, Edwin Anderson; Secretary and Librarian, S. W. Rodgers.

So the good work progresses. The Cincinnati Chapter has our hearty congratulation and best wishes for its success.

J. R. C., Danville, Ky.—Asks us to give him information as to the spherical dome shaped sky light; whether it is water-proof, and as easily set up as the square shaped one, and whether it would be as suitable to light the back room of a store as the square sky light?

We answer that the square sky light, properly constructed has advantages over the spherical or any circular form, being more thoroughly water-proof and far more easily set than the latter. As to the suitability of the spherical form, to shed light in the back part of a store, we do not think it equal in *effectiveness* to the square sky light, although it is, to a certain extent, effective enough.

While noticing this subject we would also refer to sky lights as applied to the lighting of several stories of a building. The number of stories must be taken into account and the height of each and all collectively; whether there are any obstacles to the admission of the light perpendicularly; or if there be, at what angle it could be conveniently admitted. Another consideration is the amount of space over which the light is to be distributed, and whether it can be aided by blending with the light from any other source. All these points must be considered, and the best mode adopted accordingly.

When we wish to admit a direct light from above to two or three stories, a square opening is best; having its four sides inclined upwards to an angle of, say, thirty-five degrees; and also having the well-hole or opening in each successive floor increased at an angle of ten degrees; thus giving to the lowest story the fullest benefit of the expansion of rays.

On each floor (except the last) the well-hole should be enclosed with framed glass sides, the wood-work of which, as well as of all the curbs and trimmings, should be painted white, and if porcelain paint, all the better; for the reflection and refraction of light thus gained is a great object.

The spherical dome or circular forms are not well adapted for practical use, the glass being cylindrical, the light is naturally concentrated and not reflected in its course as in the former instance; besides the construction is more difficult and expensive; as each light must be curved to its required shape, and the glass necessary for this purpose is of the ordinary thickness, and liable to breakage; while the other is entirely free from such danger. When the space to be lighted is but one story, the best mode is to bring the light through one side of a raised roof, using, the rough plate glass, and placing the same at a slope of about twenty degrees from the perpendicular. The height is regulated according to circumstance; for ordinary purposes they are two feet six inches; the roof to be raised to an inclination of from ten to twelve degrees, and plastered on the under side perfectly white to the same angle with the roof, until it meets the level ceiling. The opposite side, from the glass to the ceiling, should be continued down the same slope with that of the glass, until it meets the ceiling, and the ends are usually made to this same slope, all plastered white and finished to a polished surface.

Sky-lights of this form can be placed at intervals, according to circumstances, and multiplied to any number. They are the simplest, and also the most available, when applied to a single story.

In some cases, where it is desirable to have a superior finish to the ceiling, a sash is placed on a level with the lower surface, and glazed with embossed glass of any desired figure.

We propose in a future number of the REVIEW, to give an illustration in a

practical form of the various methods, with the rules for their proportions so arranged as to be applicable to any purpose; the details of which we will endeavor to so simplify as to be readily comprehended.

T. H. G., Marysville, East Tenn.—In reply to our subscriber's query as to the best filtering cistern, and how it should be built, we would say that it is only necessary to make a square funnel (say twelve inches square), about three feet long, and secure to the bottom of it some coarse canvas, on which place four inches thick of clean sharp sand; on the upper surface place a layer of charcoal, and over this another piece of canvas secured to the sides of the funnel. Hang this funnel securely from the covering or deck of the cistern, and your filtering apparatus is complete. If the canvas be stretched on small frames and run in on slides or slips in the funnel, they can be removed and cleaned at pleasure.

WE have lately been shown a rope molding for cornices, turned either right or left, which we think is destined to be extensively used. It is applicable for ornament to the outside angle of the Mansard roof, or is very pretty for the architrave of outside doors or windows. See advertisement.

AT a late meeting of the House Painters of Philadelphia, the Chairman stated that the object of the meeting was to adopt a uniform scale of wages to be paid journeymen during the coming season.

Mr. Rawlins, the secretary, read the following preamble and resolutions, which were adopted:

Whereas, In view of the depressed state of business of all kinds, and having the facts before us that the price of nearly everything in the shape of living has been considerably reduced in comparison with the prices of a year or more ago, and as the generally received

opinion is that wages should be reduced in order to lessen the cost of improvements; therefore,

Resolved, That we cannot help but feel that the course of the journeymen in endeavoring to keep up the present high rates of wages has had, and will continue to have, the effect of keeping a large amount of business from being done thereby, injuring not only themselves, but also their employers. We are therefore compelled to declare that the wages exacted by the journeymen during the year 1869 are more than the present condition of things will warrant them to continue to demand.

Resolved, That we feel, in justice to ourselves, customers, and the public at large, upon whom we are all dependent for support at all times, and with a still further desire to promote the general interest of the journeymen, by giving them constant employment as far as possible, that they should cheerfully submit to a reduction of wages; therefore, we do resolve that we are not willing to pay more than \$2,50 per day, of ten hours' work, during the coming season, from and after the first of March.

In the following account of proposals received for the building of a bridge in this city, a remarkable difference is shown in the bids; the same was noticeable in the bids for work on the new public buildings, given in our March number.

A meeting of the commissioners for the erection of a bridge at South street, over the Schuylkill, was lately held in the office of the Department of Surveys, No. 224 South Fifth street, Moses A. Dropsie, Esq., President. The Chair stated that the meeting was convened for the purpose of opening the proposals and awarding the contract for the erection of the bridge.

The Chairman announced the receipt of the following bids:

The American Iron Bridge, and Manufacturing Company, of Chester, Pa., Jas. McCarty, president, \$1,471,660.

J. H. Cofrode & Co., builders and contractors for wood and iron bridges \$1,175,000.

John W. Murphy, engineer and bridge builder, \$770,000.

Mr. Murphy says in his proposal: "All the work to be executed in the best manner; all face masonry to be of Port Deposit granite, except the facing of the spandril walls of the approach arches, which shall be of Chester county serpentine green stone, or such stone as the Chief Engineer and the commissioners shall be satisfied with. The backing shall be of Conshohocken limestone, or other stone of equivalent quality, subject to approval."

SILVER WARE.—The Gorham Manufacturing Company have brought about a new era in the arts of design, and Pater-familias, who is desirous of having every department of his household economy bearing fruits of culture and refinement, will patronize this house, at Providence, R. I.

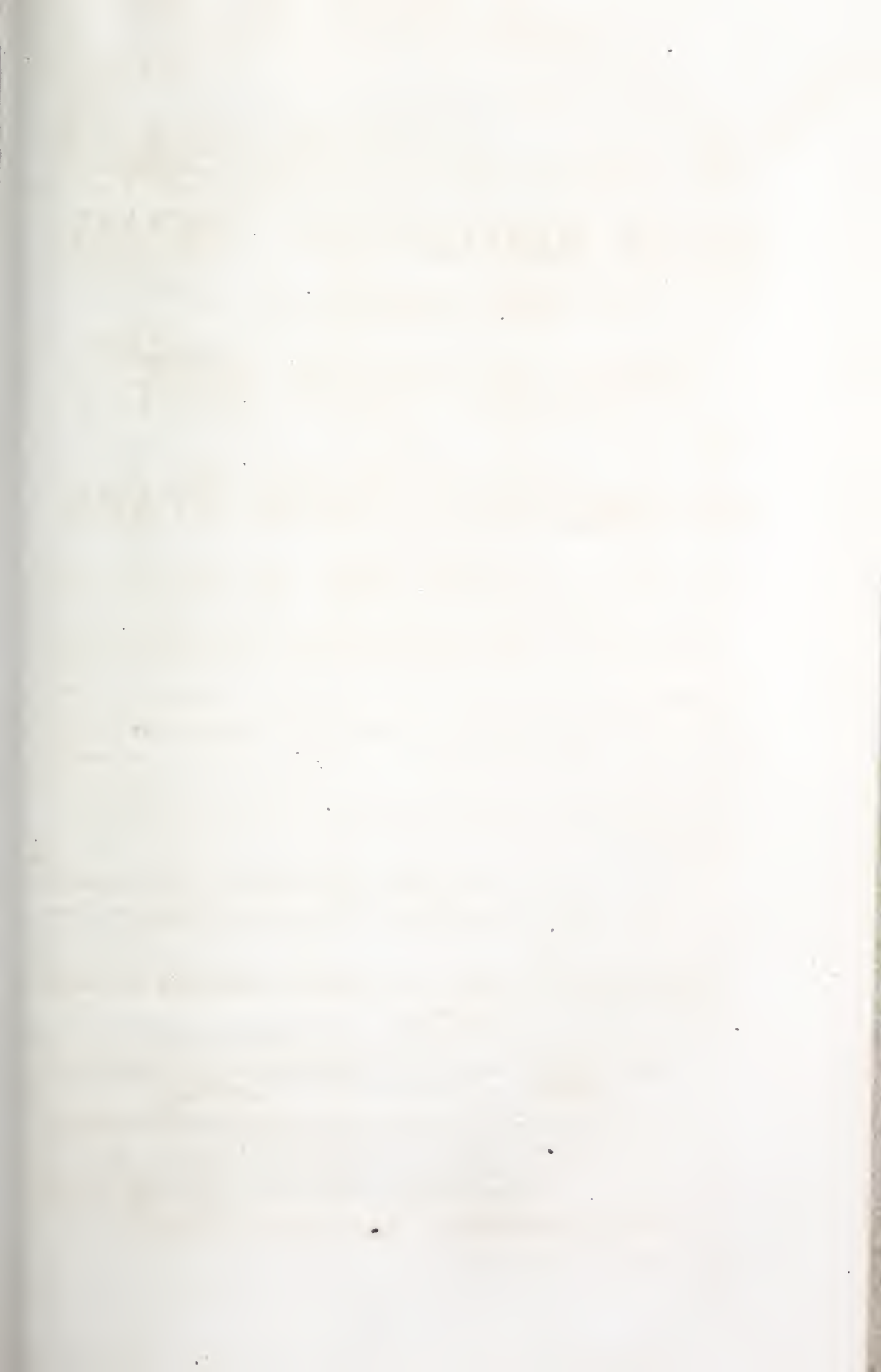
ARCHITECTURAL IRON WORKS.—Mr. W. P. Hood manufactures all description of iron, cast or wrought, railings or store fronts.

Two hundred and five permits were issued by the Building Inspectors of this city, during the month of February last.

AN IRISHMAN'S ANSWER.—A lawyer built him an office in the form of a hexagon, six square. The novelty of the structure attracted the attention of some Irishmen who were passing by. They made a full stop, and viewed the building very critically. The Lawyer, somewhat disgusted at their curiosity, raised the window, put his head out and addressed them:

"What do you stand there for, like a pack of blockheads, gazing at my office? Do you take it for a church?"

"Faith," answered one of them, "I was thinking so, till I saw the devil poke his head out of the windy."





ATLANTIC HOTEL, Norfolk Va.

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L. N. ROSENTHAL, PHILA.

ARCHITECTURAL REVIEW

AND

BUILDERS' JOURNAL.

WHO ARE INTERESTED IN ARCHITECTURE?

THERE is no greater mistake than to suppose that the subject of Architecture should be confined to the exclusive study of one class of the community, namely: those practically concerned in building. Yet this great mistake is made and reiterated by very many whose expression of opinion goes far to lead the masses, and consequently misguides them (unintentionally, we know), by causing them to pass by as uninteresting, a subject in which all are more or less concerned.

This error is, however, propogated by the public press itself; as, when noticing any publications on Architecture, the commendation is almost invariably accompanied by the observation, "of interest to architects and builders."

Now we cannot see the use of such a remark. Surely such publications are of interest to the parties most concerned; but are they exclusively so? If not, why insert this ever ready attendant on the editorial notices in question?

Architecture is public property, made for free exhibition, and a subject in which all, without exception, are thoroughly interested. Our cities derive all their elegance from the style and finish of their buildings, public and private; hence the interest which every citizen has in the advancement of our art. It has great influence in forming the

character of the community, and the substantial proofs it presents indicates the rank the nation at large assumes in the progress of civilization. How contracted then is the view of this great, this comprehensive subject, taken by the majority of persons, referring its study to the comparatively limited circle of those practicing it as an art, as *alone* interesting to them.

The two subordinate arts of Painting and Sculpture are founded exclusively on certain laws of taste, about which the uninitiated are not necessarily concerned. The observer sees and discriminates, according to the amount of natural or acquired judgment possessed by him. He feels admiration or displeasure, as his peculiar taste or fancy dictates; but he never dreams for an instant of remedying the defects painted or chiseled out before him; the work of art is in his eyes an irremediable failure of the artist, and there is the end of it.

Not so with Architecture, every man sees remedies for the defects he observes. In fact with regard to it, each individual is capable of forming an opinion, guided by that practical judgment which is more or less inherent in all, and is not confined to the human race, but appertains as well to the birds and beasts. Man may relish the passing view of a fine-art production, as such, but there is a great

deal in the observance of architectural design in which he feels more intimately interested; because on this subject he knows what he wants, and therefore understands himself.

In fact, the useful and the beautiful are blended together in every truly architectic composition; and he who feels not the inspiration of one, is sure to know the existence of the other; for the reason that the mind that is not theoretical, is practical; or it is a void. Proportion in a building suggests itself to the most common mind. Every one can tell whether a room is too low for its length and breadth, although a definite knowledge of proportion's laws may be wholly absent. So with every feature of that room; its door, windows, cornice and plinth. All know intuitively what the want is, although unable to compose for themselves. Many instances have there been of designs which looked perfectly satisfactory on paper, being very unsatisfactory when built; to the extent of obliging the owner to have recourse to very expensive alterations and improvements, and many, too many, which it were better had been pulled down altogether, and designed anew.

Who, then, are interested in architecture? We answer,—*all*; and desire that every item of information which bears upon the subject should be worthy of attention; and every publication devoted to the disquisition and promotion of it, should meet with a patronage as universal as its applicability to the wants and comforts of mankind.

One of the most serious consequences of the too widely existent apathy of the people at large to Architecture as a thing "out of their line," is that ignorant empirics often impose upon them, and urge them into the building of that which is tasteless and extravagant by assuming the name of "Architect," without any real knowledge of the rules of art, or the fundamental principles which govern it. Every profession has such drawbacks as well as ours, and we

can only maintain our integrity by sustaining the union of all earnest promoters of that knowledge it especially requires.

No Architect is beyond instruction. We are all students, and no design is carried out from which the Architect does not glean some fresh experience. If all of our brethren recognized their best interest, they would freely interchange ideas, and thereby advance the general knowledge; thus instituting a union of the most salutary sort, and one which must of necessity redound to their credit, and draw the attention and secure the respect of the whole nation for a profession whose usefulness is unquestionable, and whose claims to the appreciative attention of the intellectual world, are founded on the clearest principles of human taste.

When we ask ourselves the question then, *who are interested in Architecture?* the answer prompts itself at once. All who devote their attention to it as the first and foremost of the fine arts; all who look upon it in its true light of an art of elegant utility; all who desire to profit by its inspirational efforts to forward the interest of progressive civilization; and every lover of his country and ardent well wisher of her future, who desires that lasting monuments should be raised to mark indelibly the history of her existence, her greatness, and her state of cultivation.

The day has gone by when the claims of Architecture to attention could be passed over, without that appreciation which they now secure from cultivated minds. And the day is near at hand when Architecture will force its claims to recognition upon our collegiate institutions, to the securing of an *ex equo* rank at least, with other sciences which have been pampered for so long a time to the total exclusion of this great art-science, now so thoroughly recognized in the old World.

Who are interested in Architecture will then no longer be the question.

CONSTRUCTION IN WOOD.

IN this, as in all countries where forests abound, construction in wood is of the highest importance; and the immense advantages it possesses, can only be understood by those who have observed the great difficulties which beset the builders in those countries where it is scarce and expensive. There "necessity, that mother of invention," has to be prolific, to meet the wants which the scarcity of this material gives rise to.

In Great Britain, we constantly meet with the narrowest and most contracted cornices constructed of brick, corbelled out, of course, to a very limited extent. Or, stone bound with iron straps to the wall it overhangs; and this, at a height of three or four stories, gives but a meagre feature, instead of a most prominent one, to the front of a building. We question whether even with abundance of the wooden material, roofs could safely be made to project as our builders are in the habit of constructing them, owing to the lifting force of the wind in that insular climate, striking as it often does at the rate of thirty pounds to the square foot.

But as we in this country are not liable to these constitutional hurricanes, the umbrageous advantages of the projecting eaves will always be desirable to our dwellings.

In some sections, especially in the territory now opened up by the Pacific Railroad, the total absence of timber will drive the builders to the use of "make shifts," such as the economizing of lumber on account of the expense of carriage from the nearest markets. It will therefore become highly necessary to study this subject of contrivance in all its phases, and to bring to light the suggestive modes adopted at any time, and in any place.

Our wide awake contemporary across "the big water," the *Builder*, in a commendable effort to help house the labor-

ing classes, is bringing under public consideration in England the materials for economic building, and the method of construction with those materials most adaptable to the resources of those for whom the suggestions are intended.

We propose, however, to critically scan those plans with a view to improving upon them.

At page 182 of the current volume, we find that a contributor (W.) has actually *patented* what he considers improvements in construction, and which he believes "will prove valuable to the architect and builder."

The mode of framing he suggests, is put together in the following manner: He forms his walls of inch and a quarter battens, seven inches wide, laid horizontally all around, and these horizontal frames are placed one over another, at thirteen inches apart, every three tier being secured together by half inch diameter iron rods, furnished with nuts and washers at both ends, and running vertically through holes bored in the centre of each batten, at a distance of three or four feet. These horizontal tiers of battens are kept apart by wood, tile, or brick supports, which become tightly fixed in their places by the screwing up of the iron rods. The inventor intends to lath inside and out; placing his lathing perpendicularly. Having thus built up the skeleton walls, and introduced the several windows, doors, etc., and lathed and plastered his work, he says: "To prevent the absorption of deleterious gases by the internal wall, I use a stout washable paper, while on the outside I have already applied hair mortar, and rough-cast it with clean gravel, which gives a pleasing appearance as well as great durability. I have employed also for inside walls and ceilings, in place of laths, wire net-work, which not only makes a room virtually fire-proof, but gives a solidity and supe-

rior finish worthy the attention of the Architect. Should there be any question as to the durability of lath and plaster, I would refer sceptics to some of the oldest buildings in this country (England), where it may be seen lingering in a wonderful state of preservation, but just lacking that which, in my scheme, gives full force and effect."

All very good, but we doubt the economy of such iron bound framing, and have our suspicions that such walls are capable of torsion; or in other words, being twisted out of plumb. The reason our balloon houses here in America are so strong is, that they are sheeted with whole boards running clear from sill to cap. Such construction is truly box-like, and much stronger than the frame we have just described, because it is one unbroken construction; whereas this English "Patent" is a series of sections; or, as the *inventor* calls it, a "congeries of cells."

The true strength of any construction in wood should be in a perpendicular, rather than a horizontal direction. In fact the great necessity is, the binding the two horizontal features, the cap and sill together, by means of the walls. This mode at once gives strength and stability, and nothing can make amends for its absence save the dead weight pressure of heavy materials, such as

brick and stone; and even these have to be bound together in one perpendicular mass, by means of mortar or cement, which treatment is precisely the same in effect as using iron rods or board siding.

Where builders of economic cottages elect to use a succession of horizontal framed curbs, as spoken of in the English mode, it would be well to fill the tiers or interspaces with dry brick nogging, made tight, and coat the exterior with plaster; finishing with rough-cast. If, however, lathing is to be used on the outside, the lath should be laid on diagonally. This gives a good hold to the plaster at the same time that it serves to tie the walls well, by making that reticulation which the ancient architects aimed at in their masonry.

In constructing wooden buildings, there is one thing to which particular attention should be paid, namely: the binding the top of the walls well together, and that is accomplished by framing the wall plate all around the house, and spiking the ceiling joists down on the same; then herring-bone, bridging these joists in as many rows as are necessary to make a thoroughly stiff brace for the whole. The roof (no matter whether Gothic or Mansard,) cannot exercise any bad influence in pushing out the walls when this system is adopted.

THICKNESS OF MORTAR JOINTS.

THIS subject was brought prominently under consideration by the *London Builder*, on a recent occasion, and is now again referred to in the correspondence of that publication. We at this side of the world feel so much interest in the question: "What is the best thickness of mortar joints?" that every available opinion is acceptable, and all worthy of consideration. To follow faithfully the practice of the Mediæval school, the mortar-joint should be of

considerable thickness; and the theory of that practice is, that such extra thickness gives greater strength. But, before we can agree to such a doctrine, we must be assured that the strength and durability of the mortar are equal to that of the bricks united by it; and that all go together to form one homogeneous mass. It is very certain that the mortar made at this present day is very inferior in strength (not to speak of tenacity) to that used in the construc-

tions of the mediæval age; and that a weak, easily crumbling composition is more likely to be the average mortar now. The reasons for this deterioration of so admirable an agent have been many times considered and dwelt upon. A close examination of ancient mortar shows, most distinctly, that the manipulation of it was so careful, and the combination so perfect, that complete induration, equal to that of flint, must have been the necessary result. In fact the mortar has in many instances surpassed in hardness the stones it bound together.

Such mortar might well be laid in very thick seams or joints, by reason of its great strength; but, the less of the latter quality, the thinner should be the

joint. It is a fact, the existence of which is greatly to be deplored, that the making of good mortar is among the "lost arts;" and consequently, the less we depend upon the sustaining power of our modern material the better; so that a joint of one-fourth of an inch, or even less, is more to be relied upon than a fuller one; *adhesiveness* being the only quality left to us in practice.

Builders who are governed by taste as well as discretion, will always prefer the thin joint, in either masonry or brick work. But, in any and every case, it is expedient to *bed, back and fill* flush up. If this were done more generally we would have more permanent walls, and more presentable brick work.

LIABILITY OF ARCHITECTS.

THE accident which lately befell the new additions to the old Court-house of Chicago, is one which fortunately does not often startle the public; yet it is a subject which should command the attention of all who are concerned in the construction of buildings, where the lives of hundreds are at times exposed to just such calamities as that which has called forth the indignation of the citizens, and the action of the law.

We do not presume to prejudice this case, and in the excited state of public feeling, we should be sorry to add one unkind word to the many which have been spoken against those who were intimately concerned in that catastrophe. What we deem our province is to point our brethren to the fact of their liability for any failure occurring through neglect or oversight, whether through ignorance of their professional duties, or a desire to yield to the parsimonious requirements of building committees.

The conscientious Architect will always bear in mind that he is bound to design and construct, not merely for the

applause of observers, but for the protection and permanent security of human life. In this opinion, we are borne out by the action of the Grand Jury of the Recorder's Court, in Chicago, which found bills of indictment against three members of the Board of Public Works, Rufus Rose and Cass Chapman, Architects of the court-house in question. The bills charge the parties above mentioned with "erecting a building dangerous to the lives of the workmen, and the future occupants thereof."

This requires no reasoning to prove that it is simply doing justice to the people, for whose protection all laws are made. It is also favorable to the accused, in as much as it presents the most unquestionable opportunity for a clear decision on the actual merits of the case, unprejudiced by private jealousy or thoughtless denunciation. But apart from this action of the grand jury in this case, it is well to ponder the subject now, and realize the position in which every Architect places himself when he undertakes the designing of a building. Its walls must be of sufficient thickness

to prove perfectly reliable, and their foundations must be beyond any possibility of failure to perfectly sustain them in every part. Dwarf walls must be subject to the same requirements; as they have often to carry iron columns on which upper floors bear, as well as the timbers of the principal floor. Those dwarf walls are sometimes a source of mischief, from the fact of their not having foundations equal in depth to the principal walls, and when they are made to sustain an extra pressure, are apt to give way either at certain points or altogether.

The flooring beams require caution in the calculation of their dimensions proportionate to the span they have to cover. The roof is, however, next to the walls, the great point of attention and close study for the Architect; and this is more the case now that so many various principles are put forth from iron foundries, than in the by-gone days of timber trusses, when expansion and contraction were not to be calculated nor hidden flaws to be feared.

Architects in our day cannot be too cautious in the selection of iron beams, etc., and in this matter we fear there is too much carelessness, arising from ignorance, and more than that, there is too much liability on the part of some Architects (we trust they are few), to be seduced into the inconsiderate application of new methods and untried materials which, if they happen to fail, leave such architects justly answerable for all damage done in such failure.

Intending these remarks as general, and not applying them to the recent unfortunate accident the occurrence of which has suggested them, we close for the present by appending the report of the committee, appointed by the Board of Public Works, with the remark that the high professional character and standing of the gentlemen whose names are attached to it, ought to weigh heavy in the scale, and will no doubt carry influence with the public.

To the Board of Public Works:

GENTLEMEN: We, the committee appointed to examine the roof of the west wing of the Court House, and report to you the cause of the failure of said roof, together with the condition of the building itself, and the safety of the old portion, and also to report what, in our judgment, is necessary to make the whole complete and serviceable, would respectfully submit the following as the result of our examination, and the measures which should be taken to secure permanence:

1. In relation to the roof, we find it to be what is termed a "truss roof," made of iron, consisting of trusses placed five feet apart, each being a triangle in form—a system of construction quite common, and ordinarily good, depending, of course, upon the disposition of the material, and particularly in so adjusting it that the strain upon the various parts will be equal. We find in this roof that the rafters or struts, being those parts which are subjected to, and intended to resist a compressive strain, were not of sufficient strength, and bent, or what is technically called "buckled," and allowed the whole to fall, a result directly traceable to a defective plan of construction.

2. That portion of the roof remaining upon the building should have additional strength given it by inserting trusses between the present trussed rafters, and braces and straining rods placed between the rafters, to retain them in position. The roof should be supported temporarily by means of posts extending from the upper floor to the ridge-pole, and this should be done immediately.

3. We also recommend that the walls of the corridor be carried up to the roof, superseding the use of the iron columns now resting upon these walls.

4. We recommend the placing of three columns under the iron girder in the first story, in the Tax Collector's room, and the taking down of all brick walls now resting upon the ceilings. If par-

titions are required in place of the walls, they should be made fire-proof with iron lath.

5. We find no indications of instability in any of the exterior walls, no evidence of weakness being apparent.

6. On a careful examination of the foundations of the inside walls, no evidence of weakness is observable, except in the foundation of one iron column, which we propose to relieve by the introduction of three additional columns in the first story.

7. That the walls of the building have settled, does not, in our judgment, impair their strength, nor is the amount of

settlement much, if any, greater than in other buildings of the size.

8. After careful examination we found the old Court House building damaged in the walls and plastering to an extent that will require important repairs. But we do not consider the stability of the building materially injured. In making these repairs we would recommend a careful survey of such points as are material to the construction of the building, as possible defects, unknown to us, may exist.

E. S. CHESBOROUGH,
J. M. VAN OSDEL,
W. W. BOYINGTON,
E. BURLING.

A NATIONAL EXPOSITION OF DESIGN.

TO forward the interests of architecture in this country, it is most desirable that it should be made as attractive as possible both in theory and practice. The public must be schooled in its lessons, and examples of design must be exhibited freely in our leading cities. We have suggested this before, and will continue to urge it on the profession until it is put in practice; because we know the value of such action in materially forwarding our interests. The young men of the profession cannot but see, that their advantage lies in making their ability as widely known to the world as possible. Their seniors have become known after long years of practice, and the absence (almost) of competition. Now, however, things have greatly changed; the ranks of the profession have swelled, on account of the spread of improvement, and the knowledge of architecture is consequently more general, and is ever extending rapidly. A local reputation is no longer sufficient for an Architect possessed of the proper ambition to rise and be known. The capitalists of a community who propose to build, naturally prefer to look for fresher ideas than those with

which they are made conversant in their neighborhood, and this especially when they have no more to pay in professional fees. It is therefore desirable that public exhibitions of skill in design should be made as general as possible; that is, the chief cities of the whole nation, to have once a year, an exposition of the skill of the profession.

That such a yearly display would prove eminently beneficial, alike to the exhibitors and to the community in general, there can be very little doubt; and that it would be warmly patronised by all classes we are well assured.

Why not fix upon a mode of action and a time for such exhibition? We are quite sure that all young practitioners throughout the country will zealously enter the list in this tournament of taste, and that they only await an opportunity to try their skill in it.

The following would be our suggestions: That every State should have its special exhibition during the coming Summer; and that from these should be selected the choicest designs for a grand national exposition at New York in the fall.

That such separate State exhibitions

followed by a grand national exposition at some one or other of our chief cities, should be held every succeeding year.

That at these expositions a course of public lectures should be given on Architecture, Geology, Chemistry, as applied to the arts, and on every subject connected with design and construction. We would moreover admit all designs of furniture, ornaments, and in fine, everything relating to construction and embellishment.

By such practical means would we

introduce the ideas of the West, the East, the North, and the South to each other, and we are confident that a vast fund of useful information would thus be collected, and very valuable suggestions interchanged.

Men of learning and refinement of all professions, would eagerly embrace such an opportunity to become familiar with design, as thus laid before them in its truly national display, and such yearly efforts could not fail of promoting the interests of our profession.

PROFESSIONAL CRITICISMS.

ENVY seems to be the inherent vice of the possessors of artistic taste. It is a rare thing indeed to find a painter, a sculptor, or an architect, who will give the full credit due to a brother in his art for a work, which to the general eye gives satisfaction.

Is this really, envy, or is it a divergence of taste-judgment, which arises like a demon of discord in the minds of men peculiarly gifted? The question is one worthy of consideration, for the reason that it deals with a baleful influence tending to restrain the progress of art, and, in this regard, the advance of civilization itself.

That all the most effective works of man are open to criticism, is as certain as that there is a doubt of the existence of perfection in anything human; and that critical inquisition regarding them has a healthful tendency, there is abundant proof in the improvements which arise out of this very study; or, shall we say, *searching after defects*. Yet, such a course pursued in some, aye the majority of cases, has the effect of creating a morbid distaste for the free exercise of a genius which might add much to the world's treasury of acquired knowledge; for genius is too often the slave of pride; and, failing to break its

bondage, chafes against the chains and frets away a lifetime uselessly.

However we may deplore this weakness, it is human nature and cannot be eradicated, although it may, perhaps, be lessened in its mischievous tendency. There should be among Architects, of all other artists, a magnanimity above the crushing withering criticism of a well meaning brother's design; in the consideration of the many difficulties that beset the pathway of the most experienced among us. It is unmanly to openly condemn an effort because it does not come up to the standard of the professional critic's eye. It should never be forgotten that fault finding is the easiest of all undertakings; in fact so easy that the merest bungler can enter on it, although he himself be wholly incapable of any effort worthy of notice. The conscious strength which true genius possesses, places the mind of an independent Architect far above this inclination to invidious criticism which too many are swayed by. He has no object in depreciating the merits of a design, or even in dwelling on its deficiencies, what is worthy of commendation he generously notices, and what is not he passes over with a forbearance that redounds to his credit. To a young

Architect it is a favor which cannot be over esteemed to privately point him to his weaknesses, and such suggestions as may be thus kindly given by an experienced elder, will influence that young man's future life, cause him to love his profession, and cherish good will to all its members. On the contrary, a severe criticism on a beginner's work, by one whose judgment carries weight with the

public, makes a wound that will not heal, and implants a feeling of bitterness towards those that should be his brethren, which grows under the impulse of his pride and makes him defiant of all; and probably drives him to become irreclaimably false in his conceptions of architectural taste, pedantic, impractical, or absurd. Surely these are not very desirable attributes.

SOUTH STREET BRIDGE, PHILADELPHIA.

THIS most desirable addition to the conveniency of access to the west-side of the city, is now in a fair way of realization. We find by the following minute description of the intended work, which we take from the *Railroad Register*, of this city, that it is to be a feature in its line.

Mr. John W. Murphy, to whom the contract for the construction of a bridge over the Schuylkill river at South street has been awarded, will, as soon as his securities are approved, proceed to the erection of the proposed structure, which is to extend from the intersection of Chippewa street with South street upon the eastern side, to the high ground of the Almshouse property, beyond the Junction and West Chester Railroads on the west side of the river. It will be composed of seven hundred feet rough rubble retaining walls; two hundred and fifteen feet of irregular range retaining walls; six hundred and eighty-five feet of brick arches with stone rings; one hundred and sixty-nine feet of iron girder bridge over railroads; seventy-four feet of main abutments, standing five hundred and seventy-six feet apart with five hundred and eighty-four feet superstructure, consisting of two permanent spans of one hundred and eighty-five feet each, and pivot draw, with two openings of seventy-seven feet each, supported upon cast iron piers. From Chippewa street, for a distance of four

hundred and seventy-three feet, the roadway will be supported by retaining walls, connected at their western end by an abutment for four brick segmental flue arches, with stone rings, backing, spandrils, and coping, to be erected between the retaining walls, and the eastern main abutment upon a curve of two hundred and twenty-seven feet radius, the spans to be thirty-four feet on the north, and forty feet on the south side, with versed sines relatively of nine, eleven, thirteen, and fifteen feet. The piers to be five and one-half feet thick, located with their centre lines upon lines of radii to the curve, tangential to the line of South street at face of abutment connecting retaining walls, and to the diverted line of bridge crossing the river, at the back of the main eastern abutment. The width of the approach will be fifty-five feet from face to face, with carriage way thirty-five feet, and a ten feet wide footway upon each side. The main abutment will be thirty-seven feet from back to face, with a width of sixty feet. The western abutment of main bridge will correspond in size and architecture with the eastern, and between its western face and the Junction Railroad, a distance of five hundred and fourteen feet, there will be ten arches, built of brick, having spans of forty-five and eight-tenths feet each, and twelve feet versed sine; with piers five and one-half feet thick, and an abutment at the

Junction Railroad eleven feet thick. At the crossing of the railroads there will be three spans of wrought iron girders, fifty-six and four-tenths feet long, giving a clear headway of sixteen feet, supported by two lines of wrought-iron columns placed between the tracks of the railroad. From the abutment upon the western side of the railroads, the approach will be supported by retaining walls. The width from face to face of retaining walls, and of approach archways, will be the same as on the eastern side of the river.

All the masonry of the bridge below high water is to be laid in hydraulic cement, and above that level in mortar composed of wood-lime, and sand (or screened gravel), in such proportions as the engineer may specify. The piers in the river to sustain the main bridge superstructure will consist of cast-iron columns; those for the permanent spans (one on each side of draw) will be of two columns, eight feet exterior diameter, with ice-breakers at each end, composed of a column four feet diameter, with top at datum line. The pivot pier, to sustain the draw, will be constructed with nine cast iron columns, the centre column to be six feet diameter, and the outside line four feet diameter, placed at distances of twelve and five-tenths feet from centre to centre, so that they shall form a circle with a diameter to their outside of thirty-six feet. The columns, for permanent spans, will be sunk at the distance of thirty-six feet from centre to centre. The two permanent spans will be each one hundred and ninety feet long, and constructed entirely of iron, except the joist and planking of roadway and footway. There will be two trusses for each span twenty-five feet in height, thirty-six feet from centre to centre, outside of which will be footways six feet wide in the clear. The draw is to be twenty-three feet in width from centre to centre of truss, with outside footways six feet in the clear. The turning of the draw shall be effected by means of a

rack, secured to and around the entire circle of the twelve-inch beams forming the lower thread of the travelling-wheels, into which shall work a ten-inch pinion, having such additional gearing as may, in the judgment of the engineer, be requisite to enable two men, without undue exertion, to swing the draw. The gearing to have an upright shaft, extending to within six inches of the top floor of the draw, upon which a lever with socket head can readily be planed, and to which the necessary power for turning can be applied.

All materials provided shall be of the best description, subject to the approval of the Chief Engineer and Surveyor, or, in his absence, by the engineer in charge. And if any materials which the engineer may deem of inferior quality or unfitted to be used are brought to the work, the same shall be forthwith removed, and if the directions of the engineer are not complied with within twenty-four hours after written notice, he shall be at liberty to remove the same at the expense of the contractor.

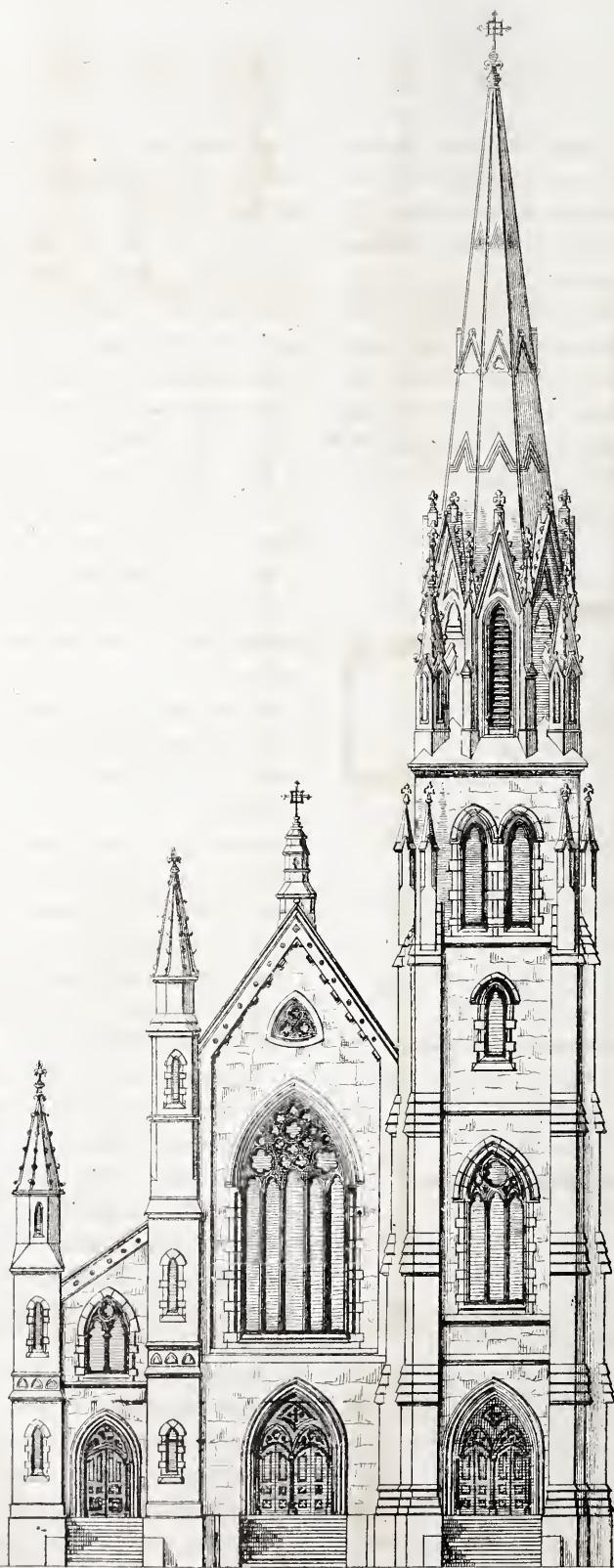
The time fixed for the completion of this work is thirty months from the date of the Chief Engineer and Surveyor's order to commence. And the contractor shall pay as liquidated damages \$200 for every day that any part of the said work, by his default, shall remain unfinished after that time.

Mr. Murphy contracts to build the bridge above described for the sum of \$770,000.

THREE painters fell, in Chicago, from a staging, which hung about sixty feet from the pavement. An iron ring, by which the scaffold was attached to a rope, gave way, and it parted in the centre. The three men all died soon after the accident. A fourth painter was also on the scaffold, but saved himself by catching a rope.

A NEW jail, to cost \$30,000, is building at Bloomington, Indiana.

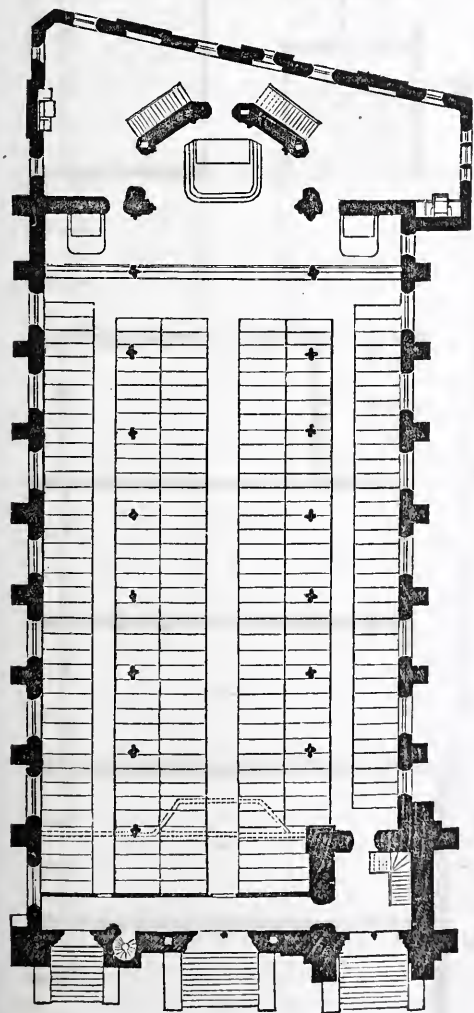




St. Mary's R. C. Church New Haven Conn.

ST. MARY'S ROMAN CATHOLIC CHURCH, NEW HAVEN, CONN.

THE main building, or body, of this handsome ecclesiastical edifice, now in course of construction, has a front of seventy-five feet, and is in depth one hundred and forty-seven feet nine inches. It will be observed on reference to the plan, that the chancel and sacristy, or vestries, extend beyond this depth, the rear building being on Temple street, where the entrances to the basement are located. The front is on Hillhouse avenue, just north of Grove street.



The foundation walls of the main building are three feet six inches, and

four feet, respectively, in thickness. The tower foundation being from five to seven feet thick.

The body of the structure is built of Trap rock, from Fowler's quarries, at West Rock, near New Haven. The window and door jambs, sills, strings, belts, water-tables and quoins are to be of "Stony Creek" granite, or granite of similar quality. The trimmings will be intermixed with a red granite from one of the Thimbee islands, near New Haven harbor. Nova Scotia stone will also be used in the trimmings.

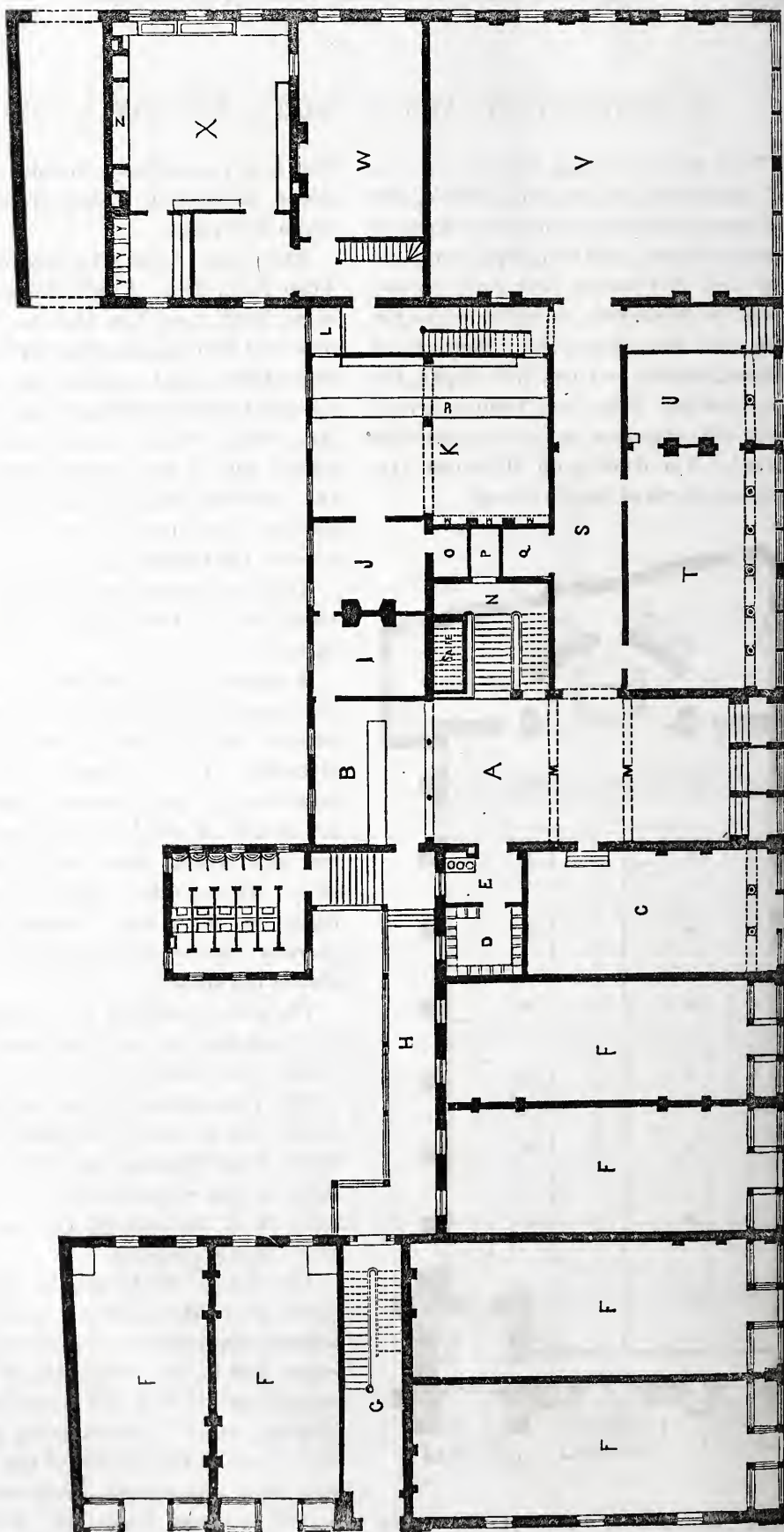
The height of the tower from the pavement is to be two hundred and twenty-eight feet.

A glance at the plan will at once show the internal arrangement of this church edifice. It is to be a clere-story construction. In the rear, the high altar stands in a semi-circular chancel, on either side of which, and facing each of the side aisles, there will be a small altar. Between the high altar and these there will be doors leading into the sacristy, where confessionals are to be placed (as shown).

The tower occupies the right flank of the front, and in it are the stairs leading to the choir gallery.

The proportions of this ecclesiastical edifice are in perfect keeping with the style of architecture in which it is designed; and when finished the effect of light from its clere-story, cannot but prove highly pleasing.

The front, on Hillhouse avenue, is raised above the side-walk, so as to give a more commanding appearance to the whole façade, and with this it also accomplishes another and a very desirable purpose, namely: the ensuring a current of air beneath the timbers of the flooring, and their consequent preservation, by perfect dryness from the destructive effects of decay.



ATLANTIC HOTEL, NORFOLK, VIRGINIA.

[SEE FRONTISPIECE.]

THIS new and very popular hotel, occupies an eligible position in the city of Norfolk, having its principal front of two hundred feet long on Granby street, and its side or ladies' entrance of ninety-four feet on Main street.

The half of the first story of the Granby street front is occupied by elegant stores; and the whole of the Main street side of the same story, is also devoted to stores, making seven in all. The remaining half on Granby street, not so occupied, is devoted to Gentlemen's Parlors, Billiard-room, Bar, etc. The office is most conveniently located in the centre of the building; thus commanding the entire supervision of the whole hotel, and being within easy reach of all the visitors.

On the second story are located the dining-room, ladies' and private parlors, as also the best chambers and suites of rooms.

The rooms are spacious, well lighted, and thoroughly ventilated.

There are one hundred and forty-seven rooms (exclusive of the parlors and offices), and ample accommodation for upwards of two hundred persons.

Prominent among its many conveniences, is an elevator for the transmission of luggage to the various stories.

The material of the walls is brick, and the fronts are of Richmond pressed brick. The dressings to windows, store fronts and cornices, are of wood, painted and sanded in imitation of Nova Scotia stone. The dormers are finished in like manner.

This building had for its Architect Mr. E. G. LIND, of Baltimore, and was contracted for by a Richmond mechanic, for the sum of one hundred thousand dollars, which was fifteen thousand dollars less than the actual value, in the opinion of the Architect; and such, un-

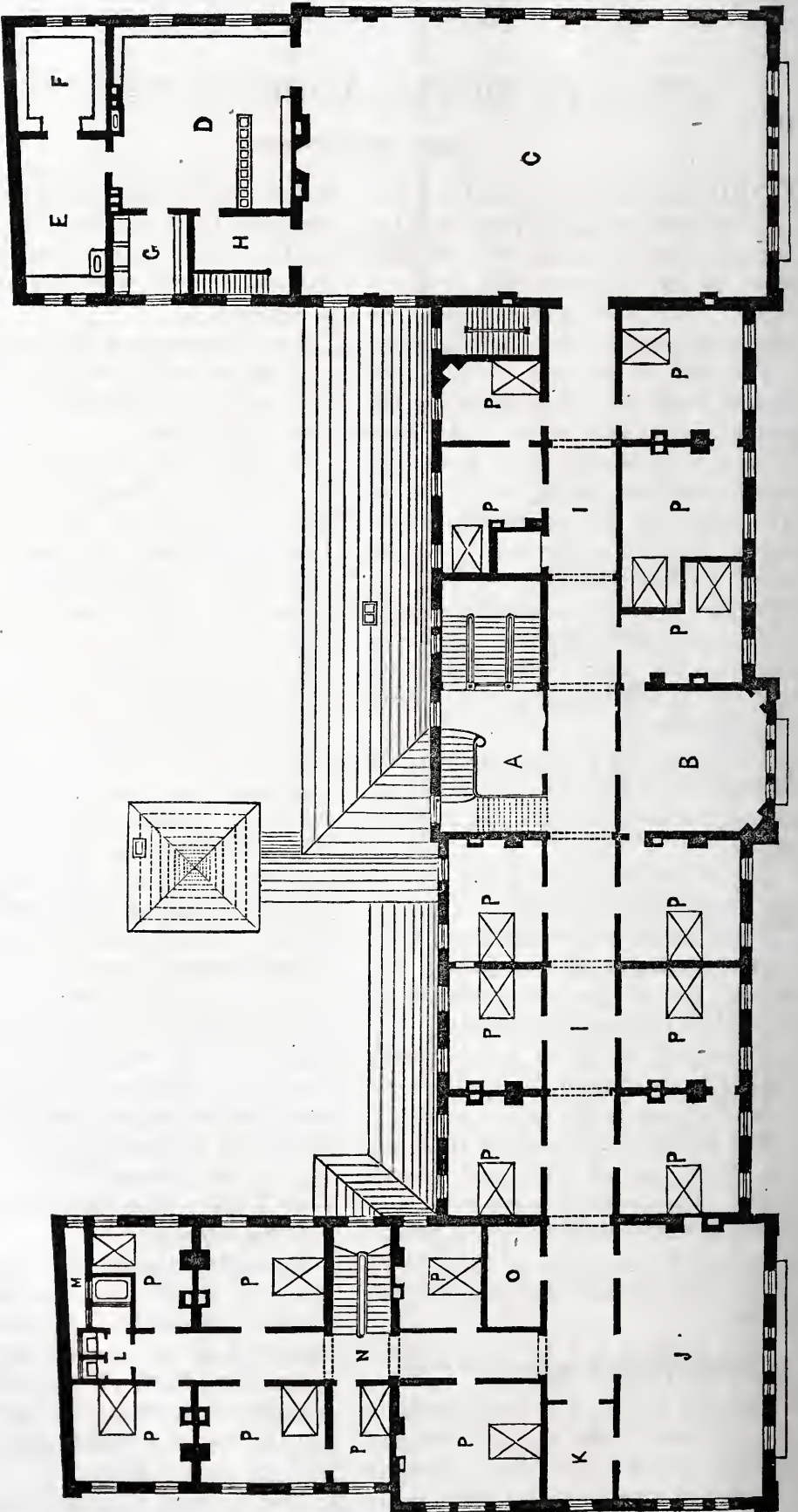
fortunately for the contractor, proved too surely to be the case. He, however, has the credit of a very prominent and well-finished work, which is a consolation at any cost.

The following is a description of the building as shown in the plans of the accompanying illustrations. The ground plan is as follows:

A, The Hall. B, Office. C, Barber's Shop. D, Cloak-room. E, Wash-room. F, F, F, F, F, F, Stores. G, Ladies' Entrance. H, Piazza. I, Private Office. J, Club-room. K, Bar-room, with counter and fixtures complete. L, Lobby. M, M, are arches which carry the weight of the partitions in the second story. N, Luggage-room. O, Wash-room. P, Closet. Q, Lift. S, Corridor. T, Gentlemen's Parlor. U, Smoking-room. V, Billiard-room. W, Servants' Dining-room. X, Kitchen, completely fitted up with range, boiler, sink, etc., and having a Pantry attached with shelving, and three dumb-waiters. Y, Y, Y, continued to the upper floors. There is likewise, adjoining the Kitchen, a lobby in which are located stairs leading to the cellar basement [omitted in the engraving]. This lobby opens into a passage, in which is a private stairs leading to the servants' rooms. From this passage there is a door leading into the Servants' Dining-room, and there is also a door connecting this last with the kitchen.

Centrally located, and quite apart from the Hotel rooms, are the Water-closets, thoroughly ventilated, and lighted on all sides; accessible from the piazza by a flight of descending steps. Underneath these is a similar provision for the use of servants, and on a level with the ground floor.

The basement is divided into cellars under the stores, which have no con-



nection with the Hotel, and store or provision cellar for the use of the latter, in which is fitted up an ice-box and cold larder, fifteen and a half by ten feet. The Servants' Hall, twenty-eight feet nine inches, by seventeen feet, having a larder twelve feet by ten, taken off of the cellar for stores just mentioned. Bakery with brick oven eight feet by ten; flour bins, shelves, table and sink. The Laundry has four wash-trays and two lifts. This room is twenty-three feet and a half by seventeen feet and a half. From the back door of the Laundry are four steps leading up to an arched way, on a level with the street, giving access from the latter to the yard in rear of the Hotel. In this yard is located a cistern or tank, built of good hard brick, laid in cement, forty-six by eighteen feet, and six feet deep, for receiving the rain water from the roofs of the Hotel, its wings and outbuildings. The outside walls of this tank are fourteen inches in thickness, with one cross and three longitudinal walls, nine inches in thickness, with arches in same, having a good coating of hydraulic cement on the insides and bottom, finished with flagging.

Five strongly framed cisterns are provided and fixed on suitable bearers over water-closets and bath-rooms, supplying same, and the house generally with water. These are all lined with lead of five pounds to the square foot superficial, having two inch galvanized iron supply and waste pipes.

The cisterns to the baths and house, formed in the north and south wings are capable of holding two thousand gallons each. They are supplied from the roofs, and have overflow pipes leading into the nearest downspout; but, in case of droughts, provision is made for supplying one of the cisterns with water from the tank in the yard, by means of a force-pump.

The wash-room is also furnished with a cistern, the capacity of which is three hundred gallons. So that the supply of water to the Hotel is complete.

The second story of the ATLANTIC HOTEL is arranged by the Architect as shown in the accompanying cut:

A, the Hall, and staircase leading to the third floor, the principal staircase being a double-return, and not continued farther up than this landing. B, a Parlor, twenty by nineteen feet. C, Dining-room, sixty-two feet six, by thirty-six feet three inches. D, Carving room. E, Cooking room. Off of this is the Store-room F. Off of the Carving room is the Pantry G, with its table, shelving, and three dumb-waiters. H, is the Hall, or passage in which is a stairs leading down to the servants' department. I, I, Corridor, nine feet wide. J, Ladies' Parlor, thirty-six feet three by nineteen feet. K, Ante-room, fourteen feet nine, by nine feet. L, Water-closets. M, Area, behind these water-closets for ventilating and lighting purposes; the brick wall being a party-wall; and no other means of lighting being so convenient as this of taking it from the yard, and using borrowed lights in the closets. N, Staircase in ladies' entrance. O, Store-room. P, P, P, Bed-rooms.

In the Carving room is a cast iron steam carving table, with compartments for eight dishes, and having all the necessary supply and waste-pipes connecting with the Kitchen range. There are four gas-burners under this carving table, placed at intervals to furnish the heat.

The third and fourth stories and attic, are cut up into bed-rooms, as are also the Mansard wings, which make a story above the roof.

The water-closets are located on each floor, and the area behind them, spoken of above, is carried up to the roof where the light is still further improved by the setting of a large sky-light.

There is much skill required in the laying out of the plans of a hotel. All the demands of domestic architecture must here be met, and numerous obstacles overcome. Mr. Lind has succeeded in all these requirements in this design.

IRON LATH SHEETING.

IT is somewhat surprising that so many centuries have passed by since lathing for plastering on, was first introduced; and the date of that most useful introduction is now unknown, although we find its existence noticed by Vitruvius, Pliny, and others. But we do not meet with anything definite with regard to lathing, until we come to the reign of Edward the Third of England, when specific statutes were enacted for the purpose of controlling the quality and dimensions of this material; one of which requires that "heart-of-oak laths shall be one inch in breadth, and half an inch in thickness." Laths, from time immemorial, in Europe, have been split. Here in America, however, we have not been content with this old custom, and so we brought machinery to bear upon it in the rending and sawing out of laths.

But, we are not a people to follow implicitly the ways of our forefathers, our "excelsior" motto is ever before the eyes of our people, prompting their energies, and urging them to push forward in the march of intellect. The great question of protection against fire has exercised its influence in promoting the use of metal as a substitute for wood in lathing, and this new principle has been made the more available, by the connecting together of the iron laths in sheets.

The great defect in ordinary wood-lathing is that the plaster covering the interstices being so easily broken by pressure or sudden collision, will, in the course of a conflagration, give a chance to the insidious element to seize on the inflammable material and attack the studs. Cracked plastering will give way under great heat, and thus leave these laths and the open channels between them completely unprotected.

Here the main advantage of the sheet-lathing becomes evident to every mind,

as a slight inspection of the accompanying illustration will at once show. For, the spaces between the laths being closed, and the plaster setting down on them being necessarily thicker than that on the laths (or projections), they are thus made the strongest, instead of the weakest portions of the whole lath-work.

These corrugated metallic sheets (as we may call them) are bent to such an acute angle, that a perfect key is obtained for the securing of the plaster; in fact much more perfect than that attainable in wood lathing; because of the resistance to the pressure of the plaster when being applied in the case of the metallic sheet-lathing, which resistance is wanting in the interstices of the wood lathing.

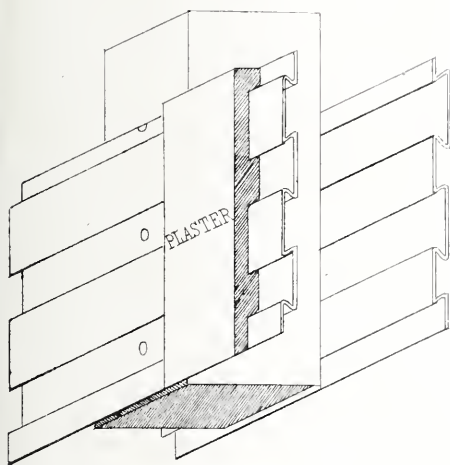
This excellent system, as represented on the adjoining page, is applied to wood, and iron partitions; on furring strips, or on the studs, without furring strips, and is a very safe method of enclosing hot-air pipes, which may be close to the laths or be kept apart by means of the furring, as shown.

The putting on of this metallic sheeting is simple and made evident in the engraving.

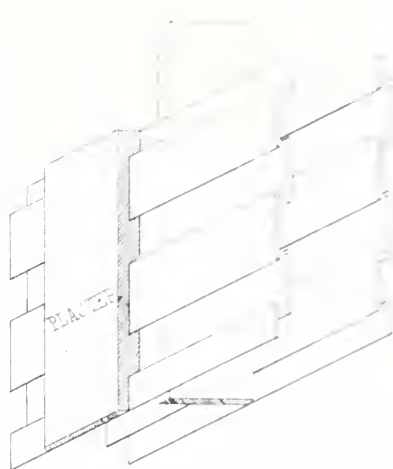
This system has been very much adopted by leading Architects in New York and elsewhere, and for partitions we really know nothing, which can rival it in absolute fitness for the best purposes of construction.

For ceilings it is equally desirable, as it will hold the plaster together under all effects of *sudden jar*. Another advantage possessed by it is that in taking down a building, these plates can be removed and re-used.

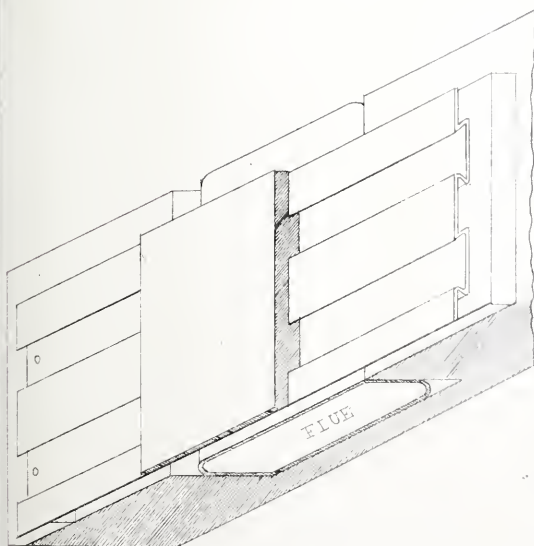
If, however, any one should form an idea of using this iron lath sheeting for the exterior of walls, we would warn them that oxidation must of necessity be the consequence of proximity to the weather.



LATHING ON WOOD PARTITIONS
 Studs 3x4 placed 2½ feet from centres



LATHING ON WALL PARTITIONS
 Studs 1½x3 placed 2 feet from centres

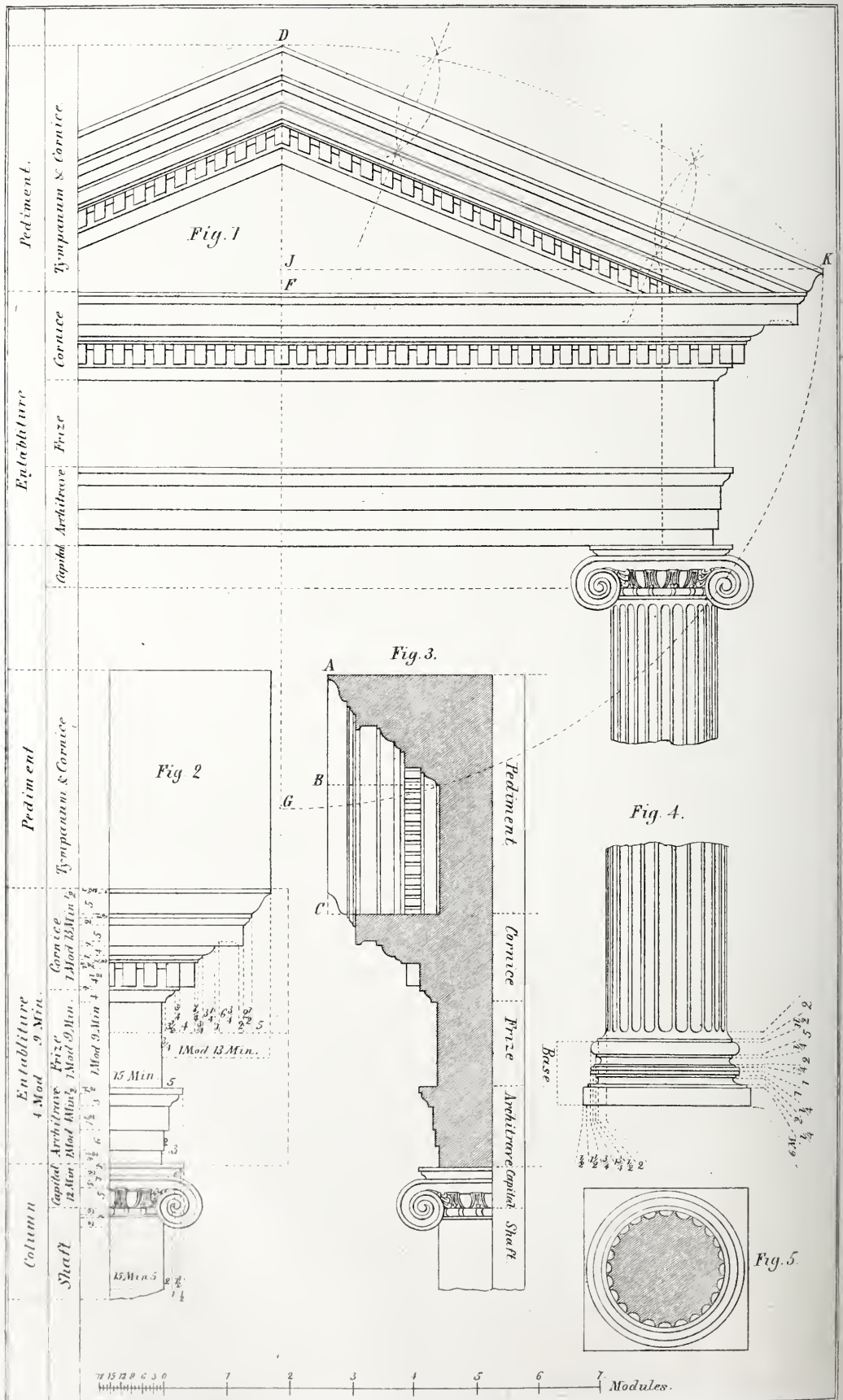


LATHING OVER HOT AIR DUCT
 Wall with furring strips



LATHING OVER HOT AIR DUCT
 Wall with furring strips





LESSONS FOR LEARNERS.

THE IONIC ORDER.

THIS is in Grecian Architecture the second, and in Roman the third of the orders. The account of it given by Vitruvius is as follows :

“When the novelty of the Doric order had abated, the desire of producing something new soon led the way to the invention of another species; and in erecting the temple of Diana, they sought a new order from similar traces, imitating the proportion and dress of women. The diameter of the columns was made an eighth part of their height; the base with folds, representing the shoe; the capitals with volutes, in form of the curled hair worn upon the right and left; and the cymatium, for the locks pending on the forehead from the crown. This new order they called *Ionic*, after the name of the country in which it was invented.”

We do not consider it essential to our purpose in these lessons, to go into any disquisition on the subject of its origin or invention, our object being simply to treat of the order as we find it in the Roman style, according to the rules of Vignola and other eminent masters. Palladio says :

“The column, with its capital and base, is nine modules high; and by a module is understood the diameter of a column below. The architrave, frieze, or cornice, have the fifth part of the height of the column. When the columns are single, the inter-columns are of two diameters and a fourth part, and this is the most beautiful and commodious manner of all inter-columns, which Vitruvius calls *eustylos*.”

Among the ancients, the form of the Ionic profile appears to have been more positively determined than that of any other order; for in all the antiques at Rome, the temple of Concord excepted, it is exactly the same, and

conformable to the description which Vitruvius has given of it.

Modern artists have likewise been more unanimous in their opinions upon the subject; all of them, excepting Palladio and his imitators, having employed the dentil cornice, and the other parts of the profile, nearly as they are found in the Coliseum, the temple of Fortune, and the theatre of Marcellus.

In Palladio's works we meet with three different Ionic entablatures; all of them very beautiful. The first is the true antique, which he made use of at the palace of the Porti; and in several doors and windows of the Thiene and Valmarana palaces, in Vicenza. The second is a very judicious imitation of the entablature in the temple of Concord, and is executed by him in the upper arcade of the basilica in the same city. The third, which is an invention of his own, being the same with that in his book, he has employed with some small difference at the Chiericato palace, at the rotunda of Marchese Capra, and in various other of his buildings in the Vicentine, or at Venice.

In this order, the capital becomes the chief characteristic, which is sufficient to distinguish it from any other, although from the preceding or Doric order it is distinguishable by many other marked differences, such as, the employment of a distinct base; the much-altered proportions; the increased number and different contour of the flutes, and the introduction of fillets; the increased ornamentation of the entablature; and by many other variations.

The Ionic capital has not all its sides similar, the similar sides being arranged in pairs, of which two, which may be termed the faces, are ranged parallel to the architrave; and two others, at right angles to the face, and underneath the

architrave, which may be called the sides. Spiral bands or volutes, as they are called, ornament each side of the face, and are connected together by a band passing across the upper portion of the face. The volutes, in fact, may be said to be formed by a band passing over the top of the shaft, and curled up at each extremity on either side of the shaft. The band being of the same width of the column, would naturally form a cylindrical roll each side, and thus may be supposed to have been formed the baluster side of the capital. These balusters, however, are not perfectly cylindrical, but hollowed out both vertically and horizontally, and, if we continue our simile, we may suppose the band composed of some compressible or yielding mass, and the roll to be tied up tightly in the middle, so as to make the intermediate sections of the roll gradually to diminish both ways towards the middle. Otherwise, we may suppose the balusters to represent two tubes or horns, so placed together that the larger ends, or mouths, are at the greatest distance from each other, and abut against the back of the volutes. This arrangement gives the balusters a much lighter appearance, which is considerably enhanced by their being usually decorated with carving.

The face of the capital measured across the volutes is about a diameter and a half, or ninety minutes, equal to the diameter of the base; the whole width is divided into three parts, of which one is given to each of the volutes. The volutes are composed of spiral moldings, which make several revolutions, and gradually approach closer to each other, as they near the centre, or what is termed the eye of the volute, where they cease.

The first of our illustrations for this lesson displays the principal details of the pediment, showing the front, the side, or contour, and the section, together with all the figured proportions as laid down by Vignola, who thus describes

the manner of determining the height of the front.

Having determined the salient line, or slope of the pediment, and taken the vertical line D G, as the middle of the front, then the point J is found by drawing an ideal line from the extremity K, to the said vertical line D G, and taking J as the centre, with J G, as a radius, describe an ideal arc joining G and K. Then, taking G as a center, with G D as a radius, describe the arc D K. The point D will then determine the height of the pediment.

Divide J D into two equal parts, and the upper part will be that devoted to the moldings or cornice of the pediment.

Next, make a section of the pediment (Fig. 3.), and on it make the depth of the cornice equal to the square of A B, the parallel surface to A B, will be the face of the tympanum, and also the exterior point of the upper diameter of the supporting columns.

In drawing the moldings the learner will, of course, be governed altogether by the example he chooses; as for instance, that of Vignola.

The following is the manner of tracing the *scotia*, as shown in the next plate.

Having determined the relative position of the two fillets, A and J, draw an imaginary perpendicular A I, and divide the same into two equal parts. Draw an imaginary line at right angles with it from B to D, and from the point B as a centre; describe the arc A D. Now divide from B to D into four parts, and taking two of these as a radius, with D for a centre describe the arc E F, and taking one of the parts B C as a radius find the point G on the continued line; and, with G for a centre describe the arc C H, the continuation of the line F G determining the point H. From H as a centre describe the arc F I. Then prolong the line I H indefinitely, and from the point I draw a line at right angles with this line, terminat-

ing at the point J, and divide it, drawing a perpendicular to this line I J, which meet I H at L. Join L and J, and from L as a radius describe the remaining arc J I, and the scotia is complete.

The Ionic order is a great step in advance of the Doric; being intrinsically artistic in its capital, and possessing

features which the latter can only claim as applications of ornament, that may be omitted without positive infringement of architectural rule.

The Volute capital is the main feature, however, and its formation is a matter of nicety and taste. In our next lesson we will give an illustration of it.

SKY-LIGHTS.

THERE are few things connected with building, which call for more study and application of device than the design and construction of sky-light; and yet it is a singular fact that there is nothing so slighted as this very subject. The greatest ignorance of the very principles which should govern the reception and transmission of light, is we regret to say more frequently the rule than the exception. Now a thorough knowledge of this most useful subject is actually imperative on architects, as well as civil engineers; for, there are cases constantly occurring which demand the nicest arrangement for the securing of the day-light which cannot be dispensed with, and must be acquired at any cost, even to the curtailing of proportions and actual diminution of available spaces. In cases where tenement houses, in populous cities cover every foot of a lot, and such houses being of necessity six or seven stories in height, the requirement of light for the centre of such buildings, without taking too much off of the apartments, is one so worthy the attention of all who design such, that we will here give it that consideration it deserves. We take the tenement house as an extreme case, whose requirements will cover all cases which may occur in Domestic Architecture, whether in the application of our observations to warehouses, stores, offices, or even to dwellings of a superior class.

Where light has to be transmitted to several floors, the general practice is to

make the sky-light proportionately large, and to give ample space to the *well-hole*, into which it is admitted for distribution. Now, in such case there is invariably a waste of floor-space on each story, which it would be very desirable at times to economise. Our present aim is to point out the best method of economising this well-hole space, and yet securing the same, or even a greater amount of light.

The accompanying illustration supposes a well-hole or interspace for the transmission of light to four stories, and these stories are in height, respectively, fourteen, thirteen, twelve, and eleven feet. We take as the width of the well-hole, sixteen feet by as much of length as can be afforded, and adopting in part a suggestion of the late Sir David Brewster, we would fix at the points denoted reflectors and refractors of light adjusted at the proper angles to transmit the light from floor to floor, until it is finally shed on the lowest floor.

The sky-light should not be hemispherical, conoidal, or ellipsoidal; although each of these forms is very elegant in itself, and in many cases, especially where appearance is sought, very acceptable to the eye.

However, the simple inclined plane method here shown and so commonly used, is, for more reasons than one, the best in practice. It is not alone economical in construction, but it is very direct in its action.

The reflection and refraction of the

rays is so systematized by this plan that the whole volume of light received through the sky-light is economised to the utmost by the reflectors, which may be of looking-glass, or any polished material suited to the purpose. These should be so arranged with lines as to be easily drawn within reach and kept constantly bright.

Sir David Brewster gave but a suggestion to architects, and threw out the idea of using *prisms* for the purposes of reflection. No doubt prisms would be much more effective than planes, but it is not always that the former can be available, while the latter, in the character of looking-glass, or burnished surface of any description, is always within easy reach.

Although we give looking-glass as a medium of reflection we do not consider it to be a perfect agent for this purpose. There are many reasons in fact for objecting to its use, besides that of its being so easily broken, not the least of which is the following:

Looking-glass is made by coating the back with metallic foil, which by smooth adhesion gives an opaque surface, impenetrable by rays of light. It is this back surface that returns what is termed the reflection, and not the upper or outer surface of the glass; so that it is evident the thinner the glass, or medium through which the rays of light prove to pass, the better. The thicker the glass the more reduced in power the reflection on the metallic backing becomes.

The rough surface produced on glass, which is so common in London for reflection of light in stores and offices, that would be dark without some such application, is worthy the attention of our architects on this side of the Atlantic, and we have wondered that it has not been introduced long before this time.

The article we allude to is similar in surface to punched stone, the indents or concaves serving the invaluable purpose of collecting a quantity of light which a flat surface could not accommo-

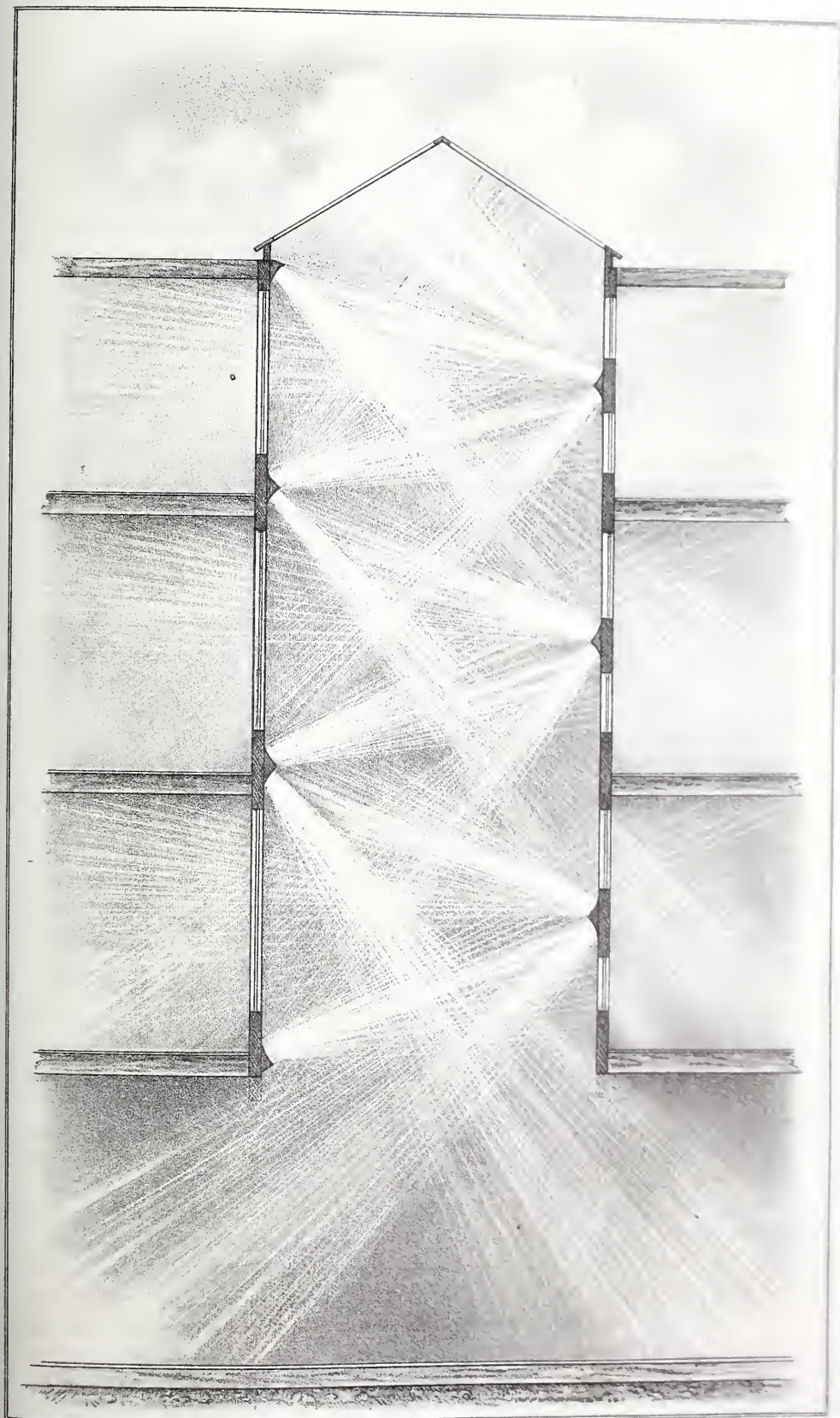
date, and sending forth a magnified supply of rays, gaining in brightness by their accumulated volumes.

It will be seen by the illustration that, besides the reflected light, there will also be a perpendicular volume, as would be the case in the event of the absence of the reflective mediums here shown. And to aid and assist still further the transmission and distribution of light, we would have (as we have suggested in another place,) the wood-work coated with porcelain paint, which affording a bright reflection in itself would greatly increase the desired effect.

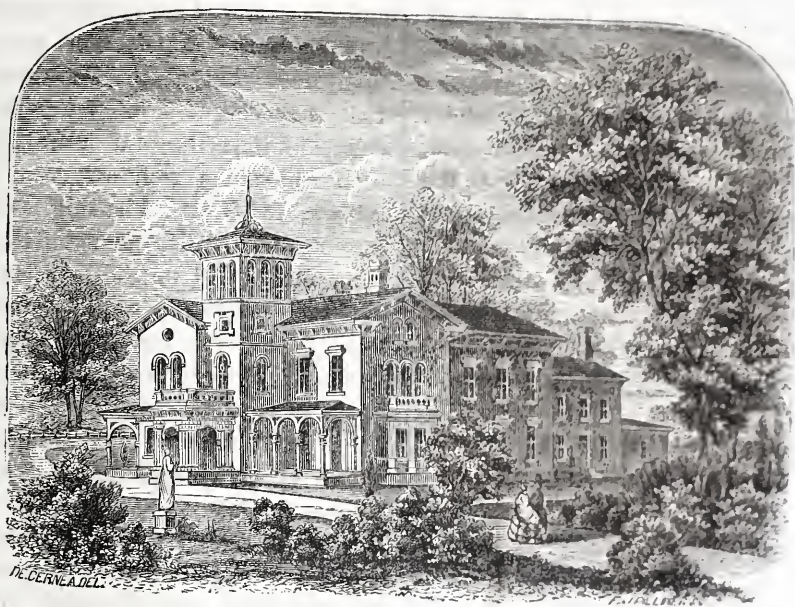
While treating this subject we would take occasion to say that in all such occasions where sky-lights are rendered necessary for stories of offices, having no other windows than those which take light from the well-hole of the sky-light, that it would be highly judicious to introduce a construction such as is common in London of movable *glass louvre* panes. When the glass slats of these are properly bevelled we know, from personal inspection, what their power of transmission and consequent usefulness is.

In conclusion, it is only necessary to remind our constructors of sky-lights that the laws which govern *light* and *sound*, are almost identical, and that what we call "echo," in the one, we term "reflection" in the other; although, in point of fact the one applies correctly to the other; echo being in reality reflection. The same form, therefore, which produces or prolongs echo, will in like manner propagate and extend light.

The bright opaque surface which resists the penetration of light will of necessity reflect the rays thrown upon it; and the smooth body impervious to sound, will cause its rejection in the form of echo, and the next obstacle of similar property which the rejected ray is thrown against will, in its turn, cast it off again; and so on while any of its power lasts.



SKYLIGHT AND REFLECTION



A COUNTRY VILLA RESIDENCE.

FOR the enjoyment of elegant ease we know of nothing more conducive to that end than the possession of a well arranged and artistically designed villa residence, with surrounding grounds laid out in all the best taste of landscape gardening.

This design is of the Italian style, and is as judiciously broken in outline as to produce a very favorable effect on the observer. The capanile is square and solid in appearance, giving a great dignity to the whole composition, which would be disproportionate without it.

The introduction of this feature into architectural composition in this country, was one of those events which especially mark the advance of utilitarian taste among us. The capanile is at once a pleasing feature, and a desirable addition to the comfort of a family residence. It affords a safe and luxurious point of view from which a wide spread landscape can be most thoroughly enjoyed, and it adds much to the healthfulness of a family taking advantage of its lofty, cheerful, and unobstructed airiness. The adoption of the Italian, Norman, or Romanesque style will favor its presence.

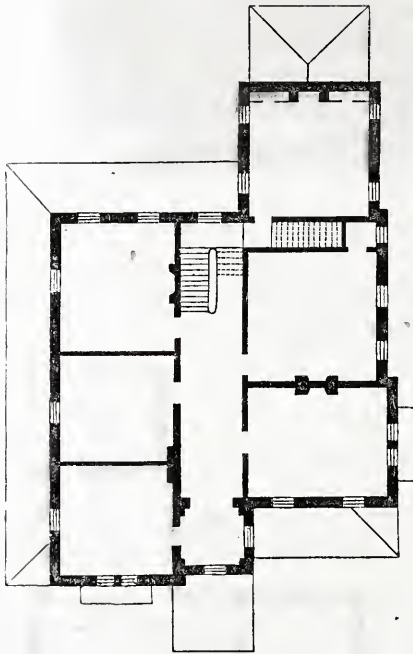
The plan of the first floor here shown is thus arranged :



A, is the Drawing-room. B, Study and Library. C, the Parlor, having a bay window. D, is the Dining-room. E, the Hall, with the principal staircase at the end ; under which is the back door leading out on the piazza, and by a flight of steps to the yard. F, Vestibule. G,

the Porch, with steps. H, front Piazza. I, the Kitchen. J, the Laundry, with steps down to the yard. K, the side Piazza, continued around on the rear.

There is a back, or private stairs between the dining-room and kitchen, leading directly from the hall. At the foot of this are doors to the kitchen and dining-room. Besides which there is a passage under this private stairs connecting these two rooms. The outside entrance to the cellar is denoted by a flight of descending steps on the side of kitchen.



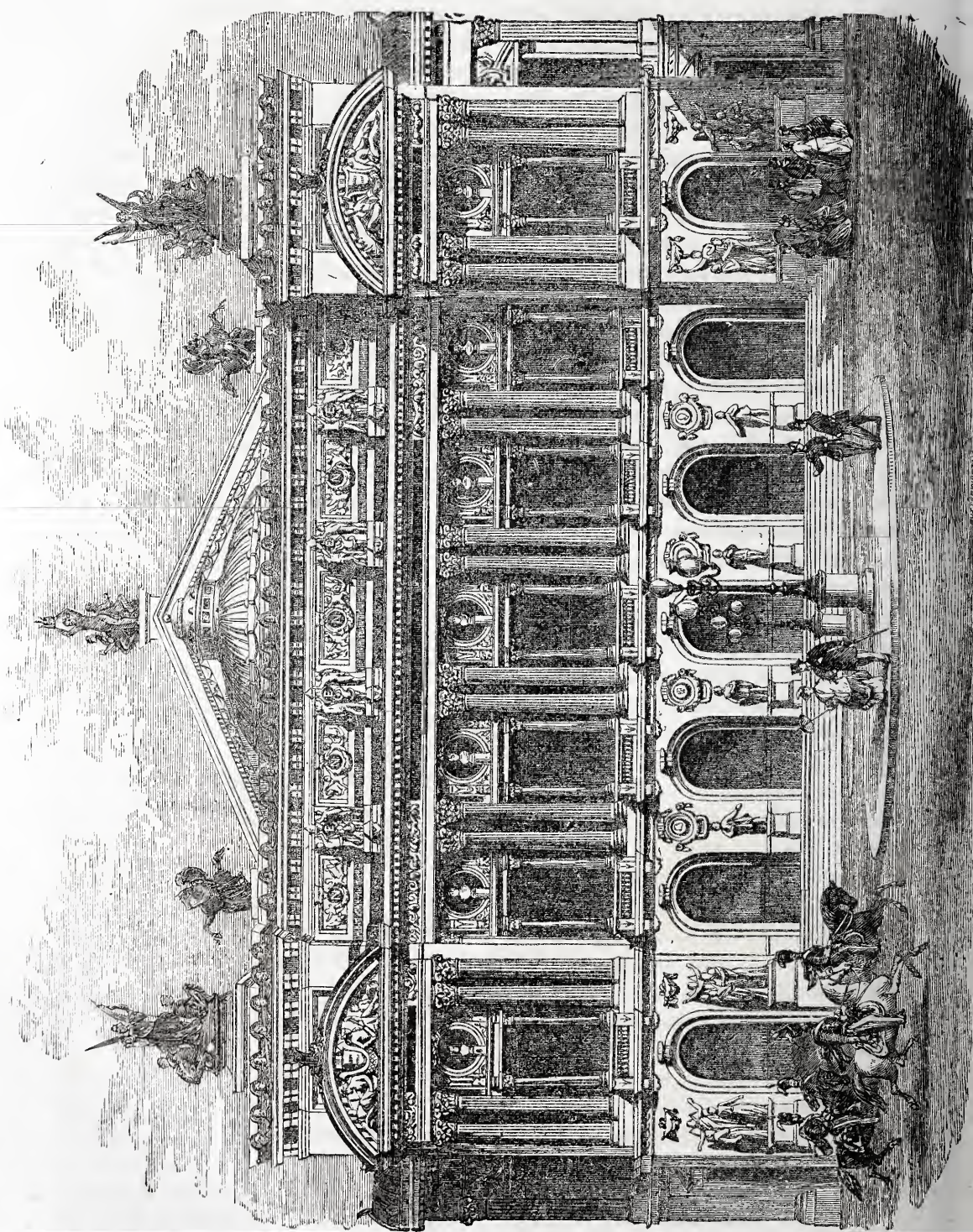
The second story plan is shown, with its arrangement of five bed-chambers and a servant's sleeping room. There is a square room in the Tower which will answer for a Ladies' Boudoir, or Dressing-room.

This villa might be executed in rubble masonry, with cut stone trimmings; or, in brick, with stone trimmings; or, even in wood, framed and clap-boarded.

Its cost would depend altogether on the style of finish and the availability of the required materials.

PAINTING AND DECORATION OF ST. GEORGE'S CHURCH, TORONTO.—In addition to being painted, the interior of the

church has been beautifully decorated, and the inside of no church in that city now presents a handsomer appearance than does that of St. George's. The walls have been painted a rich cream color, and the ceiling a beautiful sky blue, with which the rich oak color of the rafters forms a pleasing contrast. Around the walls, immediately under the ceiling, and on both sides of the spandrels above the arches, runs a deep maroon colored ivy scroll on a buff ground. The pillars are painted a stone color, the spandrel rings a deep blue, and the heads of the trefoils are finished in gold. Over the arch of the chancel, on a deep yellow ground, with a gold border, appears the inscription in old English text, with scarlet letters, "The Lord is in his holy temple." This portion of the decorations, together with a blue and amber scroll above the inscription, was contributed. The wainscot and the outsides of the pews have been grained in oak, and the tops of the latter are to be finished in a walnut color. This and the varnishing it will, however, be impossible to get done before next week. In addition to the decorations, the old pulpit and sounding board, and the old reading desk, have been removed, and replaced by more airy looking structures, which will not interfere with the view of the chancel. The pulpit stands in the centre of the church immediately in front of the communion rail, with the reading desk on the right. The space in the vicinity of the pulpit has been covered with a handsome Brussels carpet, and strips of the same extend down the aisles. Suspended from the ceiling are two bronze gasaliers, each with six branches, and each branch with three burners surrounding globe reflectors. The difference between the present appearance of the interior of the church and that it presented a few months ago, is remarkable. The beautiful chancel window shows to good advantage. The decorations are in excellent taste, and the work is a credit to the contractors.



THE NEW OPERA HOUSE, PARIS.

IN our last number we gave a description of this new institution of amusement, in Paris, and now we present the illustration from a French engraving, with which we have been favored by our cotemporary of New York, the *Scientific American*.

This grand façade is very suggestive of the purposes to which the composition is devoted. As a design it is *recherche* in the fullest sense and in some points surpasses anything of the kind to be found in the records of Architecture; although there are some very attractive specimens of opera house designs to be found in the old world, and to give this the pre-eminence may seem to some like exalting it beyond its merit, still, to our taste, it is a work of which its Architect, M. GARNIER, may well be proud.

Young in his profession, M. GARNIER

simple, rectangular in outline, one hundred and ninety-six feet front, by five hundred and seventy-four feet deep.

The description given in the *Scientific American* is so much to our purpose that we avail ourselves of it:

"The order of Architecture M. Garnier has chosen is Corinthian. In the basement there are five main arched entrances approached by a broad flight of steps, and two more at the wings which open upon the street level; between the doorways the wall is enriched with groups of statuary, and heads carved in relief upon medallions, wreath encircled, and with the name of the original below each medallion—the name of the great masters of music, as here shown.

"Above the basement rise eight pair of Corinthian columns, executed in white stone. The intervening bays are occupied, each, by a window opening upon



has, so to speak, stepped ahead of experience and placed himself at once in the very first rank of his profession.

The plan of the Opera House is a

a gallery, the top of whose balustrade coincides with the bases of the columns. The gallery is available as a promenade. Smaller columns between the large range

reduce the width of the windows, and support minor entablatures, with circular recesses containing each a gilded bust of a great musician. At the wings the larger columns support circular pediments, which are filled with sculptured groups in relief. The cornice over the row of main columns, extending along the whole frontage of the building, has inscribed upon it in gilded letters the words 'Chorographie' and 'Harmonie' upon each of the wings—upon the body of the building, 'Académie Impériale de Musique.' Above the cornice rises a deep frieze, bearing four groups of figures immediately over the columns supporting circles, within which the initial of the Empress is inscribed, the intermediate panels being enriched with a circular wreathed medallion filled with the letter N. The top of the frieze is completed with a series of classic masks, representing Tragedy and Comedy alternately, cast in bronze, and gilded. The wings of the building are surmounted with groups of statuary, at one end the Genius of Poetry, at the other the Spirit of Music. Above the frieze in the centre of the building, and crowning the body of the theatre, rises a decorated dome, while is seen a pediment forming the one face of a large roof which covers the stage and offices of the building. The apex is surmounted by a group, of which Apollo forms the central figure, while at the springing of the pediment stands on each side the presentment of Genius curbing in a rearing Pegasus.

"On the side elevations of the opera house, the architectural details which characterize the façade, are preserved, the line is broken below by the presence of a semicircular pavilion on each of the lateral frontages. Here, too, is seen the side elevation of the large roof spanning the stage, so that a totally different aspect to that of the main façade is obtained. At the rear there is but a small pretense to architectural effect.

"Every part of the building is fire-proof. The walls and staircases are of

stone, the columns—five hundred in number—supporting them and the tiers of boxes are of marble from Mount Blanc. All that in an ordinary building would be of timber—the carpenters' work—is of iron. The only inflammable material will be the scenery—easily separable from the auditorium and its dependencies—and the paneling and drapery of the boxes. An alarm of fire will be accompanied by the minimum of danger, so numerous are the outlets.

"The ceiling will, when finished, be composed of a vast number of plates of copper screwed one to the other in such a way as to be easily put together and taken to pieces again, and thus permitting the ceiling to be raised or lowered at will. The whole is divided into several sections, which are now being painted with allegorical representations of the hours of day and night, more than a hundred figures being included in the whole. The place in which the artist carries on his labor is situated in the grand cupola over the pit, and forms an immense rotunda, 120 feet in diameter, and sixty-five feet in height."



The detail of the cornice of the attic is here shown distinctly.

A CHAPTER ON CHINESE WALLS.

BY BISHOP KINGSLEY.

ALL the cities of China are surrounded by high, strong walls, whose massive proportions a stranger has no adequate idea of until he sees them. The walls surrounding the city of Pekin are from twenty-two to twenty-five miles in length, and on an average fifty feet high. This wall is sixty-six feet thick at the bottom, and fifty-four at the top, and once in a few yards there are immense buttresses to give it still greater strength. At every fifth buttress the wall, for the space of one hundred and twenty-six feet in length, is two hundred and fifty-six feet in thickness. In several places the foundation of this wall is of marble, and when the ground is uneven immense quantities of cement, as durable nearly as granite, and about as hard, have been used to level up the ground. The main body of this wall is made of bricks, each twenty inches long, ten inches wide, and five inches thick. These bricks are burned very hard, and have precisely the appearance of stone.

On the inside of this wall, as well as on others in other cities, there are esplanades, or stairways, with gates to them for ascending them. And over all the gateways there are immense towers, as large as great churches, and much higher, constructed of these great burnt bricks. On the top of this immense wall there is a railing, both on the outside and inside, coming up to a man's waist, which railing itself is a wall, thus giving a sense of security to a person walking on the top. The outside railing is made into turrets, for the use of cannon, in case of attack. The entire top of the wall is covered with strong burned brick, twenty inches square, resembling the flagging of our sidewalks in large cities,—only, as I have said, these walks are fifty-four feet wide.

There is no way of getting into the city only to go through this immense

wall. And wherever there is a gate for the purpose of getting through there is another wall built inclosing a square space, compelling all persons who go into the city to go through *two walls*, by passages at right angles to each other. The walls are so immensely thick, that these passages through them, arched over with cut stone, remind one exactly of our railroad tunnels in the United States. At each of these great archways there is an enormous gate made of strong timbers, every-where as much as ten inches thick, and covered on both sides with plates of iron, like the sides of our war ships. These gates are shut early in the evening, generally before sundown, and not allowed to be opened during the night for any purpose. They are fastened on the inside by means of strong beams of timber.

I have been somewhat particular in describing this wall, because the general construction of all walls in China are similar to this one, although they are not all so high nor so thick. But there are probably a thousand walled cities in China, whose walls will average twenty-five feet high and twenty feet thick, and another thousand whose walls may be somewhat less. Then there is the great Tartar Wall, a little north of Pekin, one thousand five hundred miles long, and older than the Christian era, thicker and higher than any of the rest. There are said to be one thousand five hundred prefectural cities in China. All these are surrounded by walls built by the government, besides the great number of cities whose walls are made at the expense of the city government alone. And when we have spoken of the walls surrounding the cities, we have by no means done with the subject. For example, in Pekin, *inside* the inclosing wall, there is another of miles in extent, surrounding what is called the *Imperial*

City. Then, again, inside of this is another immense wall, surrounding what is called the *Prohibited City*. Within this inner inclosure is the residence of the Emperor, and all the other buildings connected with royalty. And so the Altar and Temple of Heaven are surrounded by two concentric walls, of great extent and magnitude, which must be passed by means of immense gates. Then there is the great wall covered with dry thorn brush, surrounding what is called the Place of Punishment, where criminals are beheaded, and their heads exposed in cages for a terror to evil doers, and where other criminals are crucified, and yet others starved to death, amid the most piteous moanings and insane ravings for food. Again, the Hall of Literary Examination, where forty thousand men compete for literary degrees, and where the longest purse is more successful than the hardest study, is surrounded by another wall and entered by gates. Then all places of idolatrous worship, and they are legion, in these great cities, are surrounded by high walls. The old city of Nankin, on the south banks of the Yangtze Kiang, is surrounded by a wall eighteen miles long. The city of Tiensing, in the northerly portion of China, has a wall fifteen or sixteen miles in length. The city of Foochow, with one side exposed to the river Min, is surrounded by a high wall. Wherever stone can be had it is used for these structures. The city of Ranchack, also on the south side of the Yangtze, is surrounded by a wall, running over the top of the mountain a thousand feet high. I also saw, while ascending the Yangtze, a monstrous wall surrounding an area on the top of a mountain, where the Chinese of that region took their wives and children for safety during the terrible rebellion that swept over a great part of China a few years ago.

Then in thousands and tens of thousands of instances in China, a high wall is built right before the door of a private

dwelling, to ward off spirits of ancestors, who are supposed to be blind, and obliged to move in straight lines, and who will, consequently, stumble against the wall when they come to it, and give up the pursuit. After giving a good deal of attention to the subject, I am satisfied that the whole amount of wall in China, if put together, would build one twenty feet high and ten feet thick, entirely round the globe, and would require five thousand men to work steadily for two thousand years to accomplish the work.
—*Central Advocate.*

PRESERVATION OF STONES.

ALTHOUGH most of the chemical and natural agents, which exert such a detrimental influence on stone, do not exist in this climate; yet, recent discovery has brought to light the fact that our brown-stone, and some other free-stones, become liable to exfoliation and decay, and that our native marble itself changes its hue under atmospheric action; we therefore seize upon every fresh item of European information bearing on such an interesting subject.

Dr. Robert in the Paris *Les Mondes*, maintains that the use of the black oxide of copper, and its salts, will effectually prevent change in stone. He shows that the decay of granite, marble, lime-stones, sand-stones, and all natural building stones is the combined effect of various causes, and that among these is a very minute lichen, the *Lepra antiquitatis*, which is one of the worst enemies of stone, and its action is to such an extent that, for instance the beautiful marble sculptures of the well-known *Parc de Versailles* will, unless proper measures be taken for staying the process of decay, be unsightly and ugly masses of dirt, and quite irretrievably lost, as works of art, within the next fifty years. The author, taking as instances such buildings at Paris as the Bourbon Palace, the *Palais du Corps Legislatif*, the Mazarin Palace (*l'Institut*), the Mint, and others,

points out that dust, spider's webs, and the action of rain combined with the minute lichen above alluded to, hasten the decay of stone, especially of those parts where any sculpture or ornamental carving promotes the deposition of dirt and dust. Various places and instances are cited, of the application of oxide of copper and its salts, which places are open to inspection, and the length of time which has elapsed since such application, seems to warrant the conclusion that these compounds act as preservatives of stone. In reference to granite, the author states that this stone is also, according to the experience of Egyptian engineers, far more readily affected by a moist climate than one would be led to believe. The obelisk of

Luxor, brought from Upper Egypt to Paris, has become blanché and full of small cracks, during the forty years it has stood on the Place de la Concorde; although forty centuries had not perceptibly affected it as long as it was in Egypt. Granite, in a moist climate, becomes the seat of a minute cryptogamic plant, which greatly aids its destruction, and it is, moreover, a well known fact that the disintegration of this stone, which is composed of three separate minerals (quartz, mica and feldspar), depends very greatly upon the thorough and intimate mixture, as well as the chemical composition of these three ingredients, each of which in a separate state more easily withstands the influence of the weather.

EDUCATIONAL STUDIES.

THERE is one point gained by the publication of special reports which is of value, namely: calling the attention of the nation at large to subjects intimately connected with its welfare.

We look upon the recent special report of the Commissioner of Education, as being decidedly useful in this respect, and feel pleasure in extracting that part which is most vital to our own speciality:

SCHOOLS OF THE FINE ARTS, ARCHITECTURE AND DRAWING.

Schools for giving instruction in the Fine Arts, in Architecture and Drawing abound in Europe. These Royal Academies of Fine Arts, schools of Architecture, and schools of Design, are supported and maintained by the State, by the communal authorities, the municipal authorities, and by associations of citizens and artists, by each, and in rare instances, by all of these agencies combined. Fortunately for the cause of art, by these different means, gratuitous instruction to young artists is secured. The Government of the United States is

the only civilized government in the world that has done practically nothing for the encouragement of art in either its elementary or higher forms. The State and municipal governments have done, if possible, less. It is true that the National Government, during the three-quarters of a century of its existence, has expended \$559,567.93 for the frightful abortions in marble and on canvas which, by poetic or linguistic license, are called works of art. This sum is equal to about four days' cost of the late civil war, and amounts to an average annual expenditure of less than \$7,000. The little Kingdom of Belgium, we find from the budget of 1867, appropriated in that year for the encouragement of the Fine Arts, \$200,000. This is about the average annual appropriation for the same purpose.

In 1867, the Government of France appropriated 521,000 francs for the six special Fine Art schools. For 1870, in addition to the provision for the above-mentioned schools, we find the following items in the budget:

For the decoration of public monuments, 520,000f.

For the purchase of works of art and casts, 14,000f.

For the annual exhibition of works of art, 24,400f.

For the preservation of ancient historic monuments, 800,000f.

For the works of art and art ornamentation of public buildings, 1,082,640f.

Allowing that the amount granted for the special schools is the same for 1870 as for 1867, we have a total of 2,962,040 francs, or nearly \$600,000 in gold, as the annual contribution of the central Government of France for the encouragement of art, or an amount appropriated in a single year greater than the amount appropriated by the Government of this republic since its foundation. The late King Louis of Bavaria expended during his reign on public buildings used chiefly for galleries or schools of art, and for works of art, more than \$80,000,000. But facts enough have been presented to show what older governments have done in this direction, and what by ours has been left undone.

Drawing should be taught in every grade of our Public Schools. The first instinct or inclination of the child is to handle the pencil and "draw something." The sparks of what may be "that sacred fire" should not be smothered, but fanned into a flame. Drawing is the alphabet or rather the language of art, and when that is understood the child is the possible sculptor, painter, or architect. Instruction in these elements of art corrects the taste and gives the hand skill, it gives the trained artistic eye which detects the incongruous, the ungraceful, and the ill-proportioned, and which, on the other hand, the graceful, the harmonious, the symmetrical, never escape. The instructed eye derives the same intense delight from the pleasures of sight as the instructed ear from the harmonies of sound. The introduction of this branch of study into our public schools will do more than anything else

to popularize art and give the whole people a taste for art in its nobler as well as simpler forms.

DAMP-PROOF SOLUTIONS.

DAMP is the great foe of Construction. Once in possession, it will hold its own tenaciously. Corrosion and disintegration are, in fact, national enemies, stamping their monographs on our grandest edifices as the offspring of humidity. Until lately, all the means that had been devised to combat the evil had proved inefficient,—witness the unseemly condition of the exterior of the Palace of Westminster. Occasionally, as we are informed, "contraction and expansion have succeeded each other so rapidly, that new pores have been opened in the indurated material; or the sealed-up moisture has committed greater devastation than if it had been allowed communication with the outer air; or this solution, forced into the pores of the material, or laid on the surface, has itself been acted on in the same way as the material it was intended to protect, and both have perished." Yet the knowledge of a perfect indurator is of the highest import; for there are thousands of private residences in Great Britain which, at the present moment, are undergoing rapid decay by reason of damp—the health and comfort of the inhabitants being also dangerously affected thereby. The "impenetrable" solution of Messrs. R. Gay & Co., of Alton, Hants, has had the test of time, and its qualifications are numerous; first, it is guaranteed to be water-proof, in the sense that no damp or moisture can penetrate its hard and enamelled surface, which maintains for years an unchanged appearance. In the next place, it is peculiarly suitable for rapid and durable work, as it dries so quickly that three coatings may be applied in one hour. Messrs. Gay's pamphlet informs us that "solar heat will not blister it; frost will not crack it; to sea water and salt in walls it offers effectual resistance, these hitherto successful

enemies being powerless for any kind of evil. The solution is suitable to all buildings, to those of wood as those of stone or brick. It has no injurious smell, like ordinary paint, than which it is more economical and can be applied more rapidly. Another special feature is that it is suitable for painting all kinds of ironwork. Being manufactured in several colors, as well as colorless, in the latter condition it can be applied to any porous surface, no matter what the material be, without fear of change." This last assertion is of great importance, as thereby the new indurator permits of the preservation of many materials which would be spoiled by the application of substances not perfectly colorless and innocuous. We wish our readers to understand that this latter product, called the "Invisible," is of a distinct character from the "Impenetrable Solution." The former any one can apply for himself; the latter can only be laid on by the firm's workmen. We need not here enter fully into the *modus operandi* of the Invisible process, although we may state that the

compound used is induced, or, it may be, forced some distance into the pores, not only by the absorbent action of the pores themselves, but also by the method of application. Messrs. Gay & Co., the patentees, have herein produced a substance which will combine with the structure of the material into which it enters, and, by prior and subsequent exclusion of the air, produce the most permanent results. The surface never being affected or disfigured by cracking or peeling off, moisture and other deleterious atmospheric influences are set at defiance, internally and externally. The lists of testimonials in favor is well worth perusal.

We extract the foregoing from the *Architect*, as being a matter in which American builders are interested. There are buildings, and many of them throughout this country, which suffer materially from the effects of damp, and any solution which may be found perfectly trustworthy, whether emanating from this side or that of the Atlantic should be made known as widely as possible.

PIGMENTS FOR DISTEMPER PAINTING.

IN ordinary distemper painting the pigments are first thoroughly mixed with water, and afterwards incorporated with some substance capable, as it were, of binding the colors together. Glue is a material very commonly employed for the purpose, but requires a long preliminary soaking, and also very careful boiling in order to make it flow freely when mixed with the colors. This, as is also the case when gum or paste is substituted in the place of glue, involves much loss of time, this loss being added to by the necessity of straining the liquid to remove particles of grit, etc. The expenditure of time in thus preparing a given quantity of pigment or paint is, indeed, frequently more than that re-

quired in its use. Furthermore, experience and considerable skill are required in the process, and it is very difficult to determine the requisite quantity of the various pigments required for the desired color or tint, and even the most practiced artists frequently find it difficult to foretell what shade the mixed pigment will dry, inasmuch as the drying always darkens the color. These drawbacks in distemper painting have naturally attracted the attention of practical men with a view to their remedy. Mr. H. M. Johnston (who may be addressed in care of Follett, Johnston & Co., 233 West Twenty-ninth street, New York City), has patented an invention the object of which is to supply dry pulverized pig-

ments of all desirable colors, having the binding or adhesive materials intimately incorporated with the coloring substances, so that it is only necessary to mix the pigments with a stated quantity of water to render them fit for use.

The inventor uses any of the white pigments dry or in the pulp, and mixes them in water either alone, or with any suitable colored pigments, so as to impart various desired colors to the white body, or, when strong pure colors are required, uses the colored pigments or a mixture of them without the whites. If they are in a dry condition, it is preferred to grind them in water until they are as smooth and free from grit as their nature will admit. There is then added to the mass a solution of glue, gum, paste, or equivalent binding material, which is thoroughly incorporated therewith. The mixture is then dried in shallow troughs, or in any other appropriate way. When glue constitutes the binding material, the mixture may be chilled, cut into sheets, and dried on nets, after which the dried sheets may be comminuted and then ground to powder in a mill.

The inventor claims for his method of manufacturing pigments for distemper painting the following decided advantages:—It puts into every painter's hands a standard distemper color ready for applying upon the addition of the requisite amount of water. It can be put up as a white color, ready for the painter to tint to suit his fancy or his customer's taste, or can be put up in all the leading tints or colors, in either case avoiding all the usual trouble of dissolving glue, etc., and going through all the details of preparing distemper colors. It puts into market in commercial shape, to be sold by the pound, a distemper color suitable for frescoing or kalsomining that will enable every housekeeper to color the walls and ceilings of a house any tint or color desired. Any one can use it who can use a whitewash, or paint brush. All the leading whites, tints, or

colors for cardboard-enamelling, paper-hangings, etc., can be put up in this manner ready for use. The patent on this improvement is for sale, and any further information may be obtained by addressing the inventor as before-mentioned.—*American Artisan.*

MANUFACTURE OF ASPHALTE FLOORING.—The asphalte, after being broken small, is melted in a boiler; perfectly dry sand or fine gravel is then gradually stirred in, until it is of the consistency of thick mortar. It must be kept constantly stirred, and boiled for about three hours; it is then ladled out with iron buckets (well greased on the inside), poured on the floor and smoothed with a greased trowel. Before it hardens, fine, sifted, dry sand is strewed evenly over it, and it is then rubbed with a wooden float, as plaster on a wall. Before commencing to pour on the asphalte, a space should be laid off, and enclosed by splints of wood or iron of the required thickness; this space to be of such extent as the contents of the boiler will cover. If the floor is to be two inches thick, one gallon, or two hundred and eighty-eight square inches, will cover one square yard; but some allowance must be made for waste. A simple way is to lay off a strip along the wall, three feet wide, and have a splint ready, three feet long, to lay across when the boiler is nearly empty. This piece being measured, the succeeding ones can be prepared accordingly. The splints should be levelled and greased on the side next the asphalte, and nailed down lightly; when cool, the splints are knocked away, the next piece of flooring dovetailed under the former one. Finally the joints are either smoothed down with a hot iron or levelled with a mason's chisel. The substratum may be of any unyielding, dry material, such as broken stones, or bricks laid without mortar. The cost is from six pence to one shilling a square yard, according to thickness, including all expenses.

ST. GEORGE'S HALL, LIVERPOOL, AND ITS ARCHITECT.

YOUNG men just entering on the practice of Architecture as a profession, could not have before them a more inspiring theme than that presented in the short and brilliant career of the highly gifted but fragile child of genius, to whose inspiration England is indebted for the beautiful conception of St. George's Hall, Liverpool.

Commenced on the wedding day of Queen Victoria, the foundation stone was laid with all the accompanying ceremony which the event and the national holiday called forth. And although nearly twenty years elapsed from the time the first step was taken for the construction of the building to its final completion, we cannot feel that there was any delay, when the various difficulties of construction are taken into account, and moreover, when we compare such work with that of our own National Capitol.

The design fixed on was that produced by an artist whose fruitful fancy, constructive skill, and purity of taste, constituted his chief if not his only claims to public confidence. Up to the period of his being selected as the Architect of St. George's Hall, the name of Harvey Lonsdale Elmes—a young man, not then twenty-four years of age—was unknown beyond the sphere of his immediate personal connections. By those to whom he was known, however, his career was early predicted as a brilliant one, if, in the mysterious dispensations of Providence, he was permitted to pursue the course of action for which, by the peculiar bent of his mind, he seemed naturally destined, and for success in which he had qualified himself by assiduous and well-directed mental culture. This, however, was not permitted. Intense devotion to the study of his favorite art, and anxiety consequent upon being placed conspicuously before the public, in so responsible a

position, as that which his unaided talent had secured for him, preyed upon the resources of a constitution never at any time robust, and gradually undermined his strength. Prostrated by enfeebled health, he was compelled to relinquish the active superintendence of his plans, and in the more genial and less fluctuating temperature of tropical climes to seek the restoration of that physical vigor, which, alas! never returned; he died at Spanish Town, in Jamaica, on the 26th of November, 1847. "No Stranger," says Mr. Baines, in his *History of Liverpool*, "ever visited this town, for any purpose connected with the arts, who obtained so general an esteem as he did, by his gentleman-like conduct, his strict integrity and the great talent which he displayed in his profession." That the eulogium thus gracefully embodied was fully merited, has received repeated attestation, and never in more significant or gratifying form than that which it assumed amid the bustle of preparation for inaugurating the edifice, which forms at once the best evidence of his genius, and the surest testimony of sound judgment in the community by which it was adopted.

Narrowing space forbids dilation on the fate or merits of this gifted son of genius. He was born in London, and in that noble centre of artistic culture, under the tuition of his father, who, still survives, he studied the elements of his beloved and dearly-cherished profession. The productions of his architectural skill and taste are not numerous; yet Liverpool is fortunate in the possession of several, both private and public; of these latter, the Collegiate Institution, as it exists, can scarcely be looked on as a favorable specimen. The design, in its principle, as well as in its details, was not carried out. With a knowledge that, as originally planned, it would be too

expensive for the funds at command, it was reduced and impoverished to what it now appears. In general contour it is heavy, and its details are common-place. In its ponderous monotony, few traces are to be found of that graceful elegance of form, those varied combinations of outline and arrangement, and that rich exuberance of chastened fancy, which constitute the peculiar characteristics and form the chief attractions of St. George's Hall. Yet in this, as in all other architectural edifices, due attention must be paid to the site adopted for its erection ere a proper estimate of its worth can be formed. Had the Collegiate Institution been placed in a noble park, surrounded by stately trees, even the baldness of its façade would have been compensated for by the contrast of its varying lines with the devious forms and mixed tints of the foliage by which it would have been accompanied. The genius of Elmes, although chiefly conspicuous in Architecture, was keenly alive to the beauties of the kindred arts. He was enthusiastically fond of music; and was an ardent admirer of painting and sculpture. In general society he was reserved though intelligent; but among his friends he was lively, interesting, and even eloquent in his conversation. Like that of many others of delicate organization, the career of Elmes proves that the impulses of an expansive mind, are often too impetuous for the fragile mechanism by which they are destined to be carried out or perish—the ardor of his flame consumed the sources of its brilliancy—while the flashing radiance of the jewel diffused illumination, its action wore out and shattered the casket—and, at the early age of thirty-five, the grave closed over all that was mortal of Harvey Lonsdale Elmes, of whom it may, indeed, with truth, be said, “his works form his best and most enduring monument.”

Subsequent to the foundation laying, considerable alteration took place in the objects intended to be realized in the

building, which was designed originally to consist of two edifices. One of these was intended to accommodate the law-courts, the other to provide suitable accommodation for celebrating musical and municipal festivities of more than ordinary importance. In the first instance, the Corporation undertook to build the Assize Courts, and the town, as already stated, to construct St. George's Hall. It was afterwards found that the site could not with satisfaction be laid out for two edifices. The Corporation then undertook to erect the united building at the public expense, and the money paid towards the erection of St. George's Hall was returned to the subscribers. Under the changed views now entertained by the authorities, Mr. Elmes was requested to reconsider his plans with an eye to their amalgamation, and his reconsideration ended in his uniting the whole into one structure, and that structure became St. George's Hall, as it is now perfected. The improved design having been finally determined on, the building was commenced in earnest in 1841, as stated in the inscription sculptured on the principal front.

Constructed of a warm-colored and durable sand-stone, the building presents to the eye a grateful and perfectly homogenous tone of color, relieved by nicely harmonizing shadows, and forming a lively but not offensive contrast with the generally cool gray which constitutes so prevalent a chromatic tint in an English atmosphere. Raised on an elevated platform, which is approached by a fine sweep of well-proportioned steps, flanked, though not interrupted by simple basements, the general form of St. George's Hall varies in its aspect, according to the points from which the building is surveyed. From nearly every point at which a view can be commanded, its lines and masses combine in admirable groups. On the line running from south to north, its appearance is that of an oblong temple, the archi-

tectural details of which are Corinthian. Viewed from the southeast, its proportions appear somewhat strained in length as compared with its breadth, the former being to the latter nearly as four to one; notwithstanding which disparity, the general symmetry is well preserved, and a fine variety of outline is established by various contrivances which bespeak the resources of the artist, and chiefly by a considerable projection in the centre. By a skillful arrangement of his means, the Architect has succeeded in conveying, on the east and west sides of the edifice, the idea of a massive centre, with well-adjusted flanking wings. The extreme length is still farther reduced in appearance, and yet a greater variety of outline is secured by rounding off the north end into a semicircle. The elevation of the east and west façades is graceful and elegant. On the eastern front the projection referred to has been skilfully made available for the introduction of a magnificent prostyle colonnade, two hundred feet in length, consisting of sixteen fluted Corinthian columns, raised upon a noble flight of steps, and carrying an undecorated entablature, which, notwithstanding its plainness, is pleasing in the simple sweep with which it stretches from one end of the façade to the other. The western front presents a modified repetition of the same features, the most marked deviation consisting in an absence of the stepped pedestal, and the substitution of sturdy square pillars, with enriched capitals, for the fluted columns of the eastern centre.

Above the entablature of the colonnade a massive astylar attic, slightly decorated, is raised for the purpose of securing height to the interior of the principal hall; its isolation and heaviness of effect being obviated by the diminished repetition of a similar wall at either end, forming intermediate gradations between the deep curtain wall and the blocking course which surmounts the entablature upon the wings.

The colonnade already referred to constitutes one of the finest features, if not the very finest feature of the building. Individually, all the columns of which it is composed present the graceful fascinations of the Corinthian style; their bases are full, substantial, and symmetrical, and their capitals form charmingly ornamental termini to the slender yet elegant richness of line presented by the fluted shafts. The depth of projection and the well-arranged intercolumniation, by their harmonized proportion, produce such a balance of light and shade as gives beauty and relief to the general picture, and, despite the bald frieze and unenriched cornice, forcibly suggests the noble peristyle temple which constituted the artist's original design; and still forming, as it does, the germ of the whole composition, leads almost to a regret that the expanded purposes to which the edifice was afterwards made applicable, entailed the necessity of stretching out the structure, by the addition of those flanking wings, which, however beautiful in themselves, appear somewhat intrusive when regarded as a means of infringing on the stately simplicity of the original proposal. From the portico formed by this colonnade, access is obtained to the great hall by three doors of stately proportions.

The flanking wings, of which mention has been made, are slightly recessed, and each is ornamented by five square pillars, crowned by Corinthian capitals, of great power and beauty, and surmounted by a continuation of the frieze. The whole length of the building, from south to north, including the projecting steps at the south end, and the projection of the semicircle at the north, is five hundred feet; the length of the façade, exclusive of the two named projections, being about four hundred and fifty feet.

The semicircular projection at the north, or Shaw's-brow end of the building, is surrounded by a cornice and en-

tablature on the same level, and similar to that which extends along the eastern side, and is continued on the western front. The wall of the semicircle is pierced by several windows, and its plainness is relieved by eight engaged Corinthian columns, with fluted shafts and rich capitals.

The west front is much less ornate in style than the east—its chief ornamentation consisting in a projection which corresponds in magnitude with that on the eastern side; from the character of which, however, it differs in many important particulars. Conspicuous among these are the absence of the charming colonnade and noble flight of steps, which, taken together, form so fascinating a characteristic of the side already described; their place being occupied by a basement wall, out of which spring thirteen massive square pillars similar to those ornamenting the recessed wings on the east, but which have no place on this side. By a peculiar management of these pillars, and the entablature they carry, a novel effect, and a pleasing variety of aspect have been attained. The space between the entablature and the main wall is not roofed in, and the free admission of illuminating power above, as well as between the pillars, thus secured, produces a charming play of light, which, together with an absence of massed shadow, gives to this aspect of the edifice an air of softened pensiveness and quiet beauty, such as is but rarely met with.

In St. George's Hall, the Architect, following the rule generally observed in Greek temples, has directed his chief attention to the portico, which, in this instance, has been affixed to the southern end of the edifice, and here he has concentrated the fullest elaboration of ornament, combined with the purest and most majestic features of the noble style which he has selected for working out his design, to be met with in any portion of the structure. This portico has been deservedly admired by numerous

connoisseurs, and, in the opinion of the late Sir Robert Peel, it formed the gem of the whole edifice. It surmounts a pedestal of noble steps, nearly a hundred and fifty feet wide, terminating in a pediment of graceful angle, the tympanum of which is enriched by a group of massive, spirited, and characteristic sculpture, designed with artistic boldness and executed with freedom and vigor. The columns of which the portico is composed are individually of graceful and elegant proportions, crowned by capitals of sweet design and rich in beauty; singly they suggest ideas of symmetrical grace—in combination, a fullness of harmonious grandeur and exquisitely balanced power. With the exception of the frieze, nearly all the members which compose the entablature of this portico are enriched, including the coffered soffit of the arch forming the ceiling of the portico. The planceer of the principal cornice has also sunk panels, and there are carved pateras between the double fascia modillions.

The sculpture, which fills the tympanum, is of Caen stone, executed in *alto relievo*, some portions being entirely free; it has been cleverly sculptured by Mr. W. G. Nicholl and assistants, under the superintendence of Sir Charles Eastlake, P. R. E. from designs furnished by Professor Cockerell, R. A. The following has been given as an official description of the sculpture: "Britannia, her spear in her right hand, offering the olive branch with her left, is seated on her island rock, the lion at her side, and the Mersey, or ocean, at her feet. By her side is Mercury, bringing to her the four quarters of the globe; Asia first, with the *cornucopia* at her feet; America behind Europe, with the sword of power in her right hand, raising Africa with her left; and lastly, Africa, in a posture of gratitude and humility, with her sons in her arms, the breaking of whose chains is the work of Britannia, to whom she points. Beyond is Bacchus, the panther, and the wine-vase. The other

foreign products are represented by two figures, drawing to land their several cargoes. On the right of Britannia are the English arts and products advancing to meet the foreign Apollo. Science holds the torch and guides her car, and Agriculture is at her side. Behind are the plough, the spindle, and the bee-hive, —the peasant and his child forming a group to represent the domesticity of England. Beyond is Metallurgy, forging the anchor and engaged in the fabric of arms and machinery, which she knows so well how to use.

As already stated, this portion of the external structure has received the chief attention of the Architect, and here his genius has been most successfully employed. In this fine portico, and its immediate concomitants, we have a rich development of graceful forms; a studiously combined arrangement of symmetrical parts; and such a harmony of lines and masses, as deservedly constitute it the *tour de force* of the whole design; yet, from the nature of the surrounding buildings, and the peculiarly disadvantageous character of the street levels, the effect of its charming combinations is greatly marred; and its chief beauties are rendered scarcely perceptible. The street immediately in front of it slopes so rapidly down from east to west, as to render a heavy basement indispensable; and has called for the introduction of two diverging flights of steps into this basement, to obtain access to the real level of the structure. Those flights of steps, separating as they ascend, produce at the adventitious base of the building, a sort of inverted repetition of the crowning pediment, totally destructive of the general harmony, and entirely subversive of that simple unity of design, which ought to form, and which, but for this accidental deformity really does constitute, the leading characteristic and charm of this principal feature of the edifice. Another drawback, on the effect intended to be produced by this leading beauty of the de-

sign, occasioned by the peculiarity of its site, and the proximity of the adjoining buildings, is the difficulty, or rather the impossibility, of seeing it at such a distance, or on such a level, as will enable the eye of the spectator to embrace it as a whole, or survey it at such an angle as will reveal its details without producing apparent distortion. These defects are so obvious as to have given rise to numerous suggestions for remedying them; the suggestions themselves embracing varied degrees of merit. One of these, purposes to remedy a large portion of the unseemly difficulty, by raising an artificial platform, for carrying the roadway along the south and north ends of St. George's Hall, and continuing that raised platform, as far westward as the east side of Whitechapel. This plan, if carried out, in combination with a street running west towards Dale street, and a wide street running directly south from the front of St. George's Hall, nearly on a level with the large battle-molding which divides the basement from the superstructure of the hall, and continuing it on an easy gradient to the foot of Bold street, to terminate in an open square, would afford space for architectural combinations such as few towns in England possess. The grandeur and completeness of this plan has much to recommend it. It would open up a breathing space in a crowded and valuable portion of the town; and in the new streets would afford opportunity for the introduction of an improved species of street Architecture; while, along its whole line, looking towards the north, the lovely portico of St. George's Hall, with its graceful columns and characteristic sculpture, would form a noble termination to the vista.

GRACE CHURCH, AVONDALE, OHIO, has just been finished and consecrated. It is in Gothic style, and built of rough limestone, with freestone trimmings. It will seat two hundred and fifty persons, and cost \$16,000.

BLACK MARBLE AND ITS TREATMENT.

AT the present time we find that the wealth in marble, possessed by this country, instead of decreasing with the great demand made upon it for building and ornamental art purposes, is developing still more its intrinsic value in the recent discoveries of colored marbles of a superb quality which prolific Vermont has contributed to our national resources. In the rooms of the Royal Institute of British Architects, London, there are now to be seen specimens of American colored marbles which have called forth the admiration of all observers. Our present object, however, is to call attention not to the white or to the vari-colored, but to the black marble which in its own way confers so much benefit on art by the very force of contrast it creates. It is generally of a fine texture (especially that which is a very deep black), but it is rare to find it without calcareous spar in veins through it. The best quality occurs in beds of from three to eight inches thick; but some beds are thicker. It is tough, and contains a good deal of carbon, which imparts the color. It is greatly valued for inlaying, and is extensively used for vases, pedestals, chimney pieces, etc.

It is occasionally ornamented by etching and engraving, in which processes the polished surface is removed, and the brown color of the rough marble exposed. Powdered white lead is sometimes rubbed into the etched surface, to increase the effect. The French have a method of ornamenting marble in this way by etching with acids deeply into the marble various designs upon a properly prepared bituminous ground. When the corrosion has gone sufficiently deep, the cavities are filled up with hard colored wax, so prepared as to take a polish equal to that of the marble when cleared off. Drawings thus made on black marble, and filled in with scarlet

wax, after the manner of Etruscan, have a fine effect, and are used for tables, panelling, etc. They have a method in Derby, England, where this art is carried on to a considerable extent, of exposing the brown color without destroying the polish, the effect of which is more durable than ordinary etching.

Rosewood marble, so called from its marking, resembling that of rosewood, is extremely hard and of close texture, being next in these respects to the black variety. The beds are of considerable thickness, but the most beautiful part of the marble is only about six inches thick. The *russet* or *bird-eye* marble takes its name from its color and appearance—the shades varying from light gray to brown. It contains numerous minute embedded or encrinital fossils, and is found in layers of from six to eighteen inches in thickness.

As yet, we believe, there has been but one quarry of black marble worked in this country, namely: that of the Mosquito Valley, near Williamsport, in this State; which is a very compact, excellent material, but until very lately every effort to polish its surface proved a failure. We, however, have now on our table a highly creditable specimen of polished black marble, from the quarry just named, and we entertain a strong hope that black marble in abundance will be found native to our soil, and worthy of a distinguished place in the art-materials of our country.

A WROUGHT-IRON chimney one hundred and ninety-six feet high, and six feet seven inches in diameter, has just been erected in Pittsburg. Another is to be put up two hundred and seventy-five feet high. The first was riveted together in a horizontal position, and then lifted to the perpendicular by a crane. The other will be made upright.

A PROLIFIC INVENTOR DEAD.

THIS is the acknowledged land of inventions (we mean it in the *true* sense), and the capacity or aptness for this species of "smartness" is possessed in an extraordinary degree by some, we might say many of our people; but the recent sad event, recorded in the *New York Sun*, of April 1st, gives evidence of our having had a wonder among us that we now regard with astonishment when the great living fact has died in our midst.

Seth Boyden, the inventor, died at his home in Middleville, Clinton township, near Newark, yesterday, in the 82d year of his age. Mr. Boyden was a native of Foxboro, Mass., and settled in Newark in 1815. He brought with him a novel machine of his own invention for splitting leather, which has since been so improved that a hide may be split into several layers. Another man would have made a fortune from the invention, but Boyden's restless mind always abandoned a machine as soon as it was a success.

His next invention was also of great value to leather manufacturers, being a machine for cutting brads. In 1818 he was in the silver plating business, and commenced experiments on a varnish to be applied to leather. Out of this came patent leather, of which he manufactured the first in 1819, using it in his own shop only until 1822, when he manufactured it as an article of merchandise and threw it on the market. His sales in 1822 amounted to \$4,621; in 1824 to \$9,703, 06—the small beginning of what is now a vast trade. But in 1831 Mr. Boyden sold out of the business.

Seth Boyden made the first malleable iron on the 4th of July, 1826, and continued its manufacture until 1831. In 1835 he started a machine shop for the construction of steam engines. The Morris and Essex Railroad found its

heaviest difficulty in the grade of one hundred and forty feet to the mile from Broad street to the summit of Quarry Hill, and it was proposed to place a stationary engine on the hill to raise the trains by traction. Mr. Boyden contracted with the road to build a locomotive which would do the work, and to the astonishment of almost all, accomplished it, and the first train over the road was drawn steadily and without difficulty over the hill by Boyden's engine. It was on this machine that he made a memorable improvement in placing the driving rod outside of the wheels. Boyden threw the driving rod outside, made the wheel itself a substitute for the crank, and so gained the highest leverage, the most direct action, and the minimum of friction. While in this shop he invented the well known "cut-off" of the steam engine.

When the Daguerrean process was first made known Mr. Boyden saw an account of it in the newspapers, and patiently worked the thing out, making the first daguerreotype ever produced in this country. But there it ended, and except from an acquaintance with Prof. Morse which followed, there were no results. But at that time Prof. Morse was busy with his grand invention, the telegraph, and Mr. Boyden was largely consulted upon the mechanical difficulties to be overcome. He was at that time no electrician. Yet after his attention had once been directed to electricity, he went into the subject with zeal. It occurred to him that if an electric equilibrium is to be maintained, even in thunder storms, the lightning cannot all come from one direction, and that there is just as much *a priori* reason that bolts of lightning should pass from the earth to the clouds as from the clouds to the earth. To test this he set up an electrometer showing the direction of the cur-

rent, and found that some of the fiercest "strokes" came from the ground and went up to the clouds. A subsequent study of the incidents of lightning strokes confirmed this idea, and his conclusion was that a surcharged earth is quite as likely as a surcharged cloud.

Another of his inventions was the manufacture of "spelter" in this country. It is one of the most available forms of zinc. Still another was that of Russia sheet-iron. This has always been regarded as one of the most profound secrets of the arts, but Mr. Boyden plodded through it and made a good article of Russia sheet, but at a cost so great that it cannot compete with the imported article. While upon the list of his mechanical achievements, given quite incompletely, the Burr Hat Body Forming Machine comes in.

It is not Seth Boyden's invention, but he made an improvement upon it, and for the only time in his life applied for and secured a patent. A dozen others had tried to improve this machine, which is a wonderful combination of science, speed, cheapness and convenience, and all had been enjoined by the United States Supreme Court except one or two which had been bought out by Burr. Boyden's improvements stood the test in law, and after a tedious and expensive suit, in which he took small interest, the case was decided in his favor. This was in his old age—after he had passed his three-score years and ten, and seems to have been almost the only instance in which he cared at all who owned his inventions.

In 1849 he took the "gold fever" and went to California, where he was noted as a successful man in "prospecting."

In agriculture he was the same quiet and successful student. He once said laughingly to us (he never boasted) that with twenty years more of life he could make a strawberry as large as a pineapple and preserve the original flavor. The "Agriculturist" was his berry, so was the "Boyden No. 20," so was the

abundant and yielding "Green Prolific," and finally that chief and prince of strawberries, the "Boyden No. 30," often growing to the diameter of two inches and the weight of a full ounce, while it has all the excellencies of flavor, fineness, and color. In grapes also he had a series of successes, producing some fine hy-breds—and that brings us to his one failure. He could never make a good wine. He tried with the old fidelity and endurance of temporary defeat, but the wine was never good. At the time of his death he was at work upon some experiments in bronze.

LAYING CAST IRON PIPES UNDER WATER.—John F. Ward of this city, has recently completed his contract with the Croton Aqueduct Department of New York, for the laying of an eight-inch iron pipe under the Harlem river, from Manhattan Island to Wards Island. The pipe extends from the foot of 121st street on the city side, directly across the river to the landing house opposite, a distance of about eight hundred and fifty feet. The pipes are cast in eight foot lengths, and united by means of a ball and socket joint.

The method adopted by Mr. Ward for laying the pipe was both novel and simple. A large open boat was provided, in which was carried a supply of pipes and melted lead. At the stern a small supporting frame was placed. The pipes were jointed together in the boat, and as fast as completed, pushed out over the stern into the water, thus forming a flexible string of pipes, which sank and rested upon the river bottom as the boat progressed. The work was easily and quickly accomplished. The depth of water in the Harlem river where the pipe lies is forty feet.

Mr. Ward has recently laid a water pipe of three feet diameter, on the same plan, under the Hackensack river, N. J., for the Jersey City Water Works.—*Scientific American.*

MONTREAL—ITS PUBLIC BUILDINGS—THE CAPITAL OF CANADA.

ON Friday last I crossed the border line which separates the progressive United States from the non-progressive and stand-still Dominion of Canada. The first place to "do" was, of course, Montreal the metropolis of Canada. My first visit, as it is of almost every tourist coming here, was to the French Cathedral on Notre Dame street. It occupies one side of the French Square, or Place d'Armes, in the very centre of the city. It is supposed to be the largest building in America, and can contain ten thousand people without crowding. It is built of Montreal stone, in the perpendicular Gothic style of the Middle Ages, with twin Gothic towers two hundred and twenty feet in height. In the north-east tower is a fine chime of bells, and in the northwest one, is what is said to be the largest bell in America, cast expressly for this church, and weighing twenty-nine thousand four hundred pounds. You ascend these towers by a flight of two hundred and forty-five steps. The view from them is necessarily grand and extensive. The court-house next demanded my attention. It is situated on the same street as the Cathedral, opposite the Champ de Mars, the favorite promenade for citizens and strangers; also the general review and parade ground of the military. The court-house is a commanding pile of cut stone, in the Grecian-Ionic style, and contains court-rooms for the superior, criminal, circuit, and appeal cases, besides a spacious legal library and offices in connection with the different courts. The other most prominent and commanding building of the place is the Museum of Natural History, on University street.

The Victoria Bridge of the Grand Trunk Railway, that spans the St. Lawrence river here, is the curiosity of Montreal. By the kindness of the railway authorities your correspondent ob-

tained the proper pass to enable him to view one of the most stupendous and massive structures of modern times, which is frequently denominated the eighth wonder of the world. It was inaugurated by H. R. H. the Prince of Wales, in August, 1860. It is tubular, consisting of twenty-three spans of two hundred and forty-two feet each, with the exception of the centre span, under which the steamboats pass, this being three hundred and thirty feet wide. The dimension of the tubes is nineteen feet high at the extreme ends, rising to twenty-two feet in the centre tube, by sixteen feet wide. The bridge is approached at each end by a causeway, terminating in abutments of solid masonry. The southern causeway is two hundred and forty feet long, and the northern one thousand four hundred, the width of each being ninety feet. The total length of the bridge is ten thousand two hundred and eighty-four feet, or about fifty yards less than two English miles. In its construction three million cubic feet, or, in weight, two hundred and fifty thousand tons of stone and eight thousand tons of iron, were used, and the cost amounted to over \$5,000,000. By this bridge two extensive and populous sections of country are united, aiding in no slight degree their social, agricultural, and commercial development. Montreal contains a population of about one hundred and thirty thousand inhabitants, and is increasing yearly at the rate of nearly ten thousand. It is undoubtedly one of the most substantially-built cities on this continent.

Ottawa has been selected by her Majesty the Queen as the new capital of the Dominion, the chief seat of government having for many previous years been at the cities of Montreal, Quebec, and Toronto, in turns, for a

certain number of years at each. The numerous quarrels that ensued, and the jealousy that was engendered against the one that happened at the time to be favored, made it necessary to choose some fourth place; and Ottawa was selected as being the most central and desirable that could be found. The government buildings that have been erected here certainly do credit to the Architect that designed them, as well as to the public spirit of the Legislature, who have furnished the means for bringing the work to a successful termination. The Parliament buildings, with the departmental offices, occupy three sides of a square on a bluff overlooking the river Ottawa, on which the city is situated. They contain two

legislative halls—the one for the Senate, the other for the House of Commons, both being of the same size as those provided in the English Houses of Parliament for the Lords and Commons, and like their originals, are very handsomely decorated. A large library is also provided, capable of accommodating half a million volumes. The buildings are designed in the Italian-Gothic style, and constructed of stone found in the neighborhood. The cost of the buildings was \$2,500,000. The rest of the city is of course rapidly increasing, and the whole of it, nearly new, is very handsomely and substantially built, and contains a population of about twenty thousand.—*Cor of the Press.*

A BRIDGE EXTENDING BROADWAY, IN BOSTON.

AS this is one of the most important structures of the bridge or viaduct class ever erected in that city, a description of it, as given in the following report of the city Engineers may be of interest:

The structures embraced in the contract with the Moseley Iron Bridge Co., include everything except paving, between the easterly side of Foundry street in South Boston, and the north-westerly side of Lehigh street, in Boston proper, a distance of 1,117 feet.

Beginning at the easterly side of Foundry street, the first structure is an iron bridge over said street of a clear span of fifty-six feet, and at an elevation of twelve feet in the clear above the same. This structure is to rest upon a substantial stone abutment built by the city, on the easterly side of the street, and upon wrought-iron columns built by the contractor on the westerly side.

The bridge is a modification of the style known as the "Bowstring Girder," and consists of two main wrought-iron arches springing from shoes or sockets at the ends, which rest upon the abutment or pier, the ends being tied together

by a horizontal tie, or what is usually called the lower chord. This lower chord and the floor beams or cross-girders of the roadway and sidewalk are suspended from the arches by vertical suspension bars. Besides the arches, a supplementary horizontal boom or upper chord of wrought-iron is provided and attached to the arches at the crown, adding greatly to its strength, and, by means of the vertical and diagonal bars connecting said chord with the arches, forming a spandrel-bracing, the stability of the arch, under a travelling load, is greatly increased. The height of the arches in this span is five and one-half feet from the lower chord to the upper chord at the centre.

Each arch and the attached upper chord combined is to have a sectional area of twenty-six square inches, and each lower chord at its centre a sectional area of twenty-six square inches, exclusive of rivet holes. The vertical suspension bars to be of bar-iron, three inches by $\frac{3}{8}$ -inch, and to be placed two feet apart, and the diagonal or lattice bars to be two inches by $\frac{1}{2}$ -inch, the intersections

of these bars to be covered with ornamental castings. Stays or bracings, of 3-inch T iron, are to be placed eight feet apart to give lateral stiffness to the arches. The floor-beams or cross-girders are to consist of double 9-inch wrought-iron I beams, brought into compressive strain by tension rods of two inches diameter, attached to the I beams beneath the main arches, and strained over struts of cast-iron. These beams project beyond the arches to form a support for the sidewalks, and are placed four feet apart. Upon these iron floor-beams or cross-girders are to be laid, for the roadway, cast-iron plates four feet square and $\frac{3}{4}$ -inch thick, ribbed twice across the surface by ribs three inches by $\frac{3}{4}$ -inch at the middle, and tapering toward the edges. This completes the roadway ready to receive the wooden pavement, which is to be furnished by the city.

The sidewalks of this bridge and throughout all the structures hereinafter described, are to be floored with yellow pine three inches thick. The railing for the sidewalks is to be uniform throughout the whole length of the several structures, and is to consist of an upper rail of double $2\frac{1}{4}$ -inch I iron, middle and lower rails of double 2-inch I iron, with vertical rods $\frac{3}{4}$ -inch diameter, placed six inches apart on centres and diagonal rods $\frac{1}{2}$ -inch diameter,—the intersections to be covered with ornamental castings. Stays or bracings of 3-inch T iron will be introduced wherever required to give lateral stiffness.

The next structure extends from the last described, to a point on the easterly side of the Old Colony and Newport railroad tracks, a distance of about four hundred and forty feet. In this structure the street is supported upon wrought-iron columns set in rows of three, crosswise the street, twenty feet apart; the rows being eleven feet apart, lengthwise the street. The roadway being forty feet wide, and the middle column of each row being placed in the

centre, the two outer ones come directly under the sidewalk curb, and the sidewalks—each ten feet wide—are supported upon wrought-iron brackets attached to the outer columns. These columns are twelve inches in diameter and $\frac{1}{4}$ -inch thick, of the Phoenix Company's make, and are each supported by three piles cut off two and one-half feet below mean high water, and capped with stone to a point four feet below the surface of the ground. That portion of the column which comes below the surface of the ground (four feet deep) is enclosed in boxing two feet square, and the space between the boxing and the column is filled with concrete composed of broken stone or gravel, and hydraulic cement.

The columns themselves are also filled solid with concrete, and are then capped with a cast-iron cap, so formed on its upper side as to receive and hold in position the transverse girders, which are 12-inch wrought-iron I beams. These I beams project beyond the outer columns, and rest upon the brackets before described, forming the support for the sidewalk. Upon these 12-inch I beams, longitudinal beams of heavy 6-inch I iron are placed under the roadway, and are four feet apart from centre to centre. Upon these rest the cast-iron plates four feet square, similar to those above described.

The last or westerly row of columns, near the Old Colony and Newport Railroad, supporting the structure just described, differs from the others inasmuch as it forms a pier upon which is to rest the southerly end of the long span bridge hereinafter described. The number of columns in this pier is the same (three); but the two outer ones are to be twenty-four inches in diameter, and five-sixteenths of an inch thick, and the middle one twelve inches by one-quarter, like the others. These columns are to be connected at the tops by a pedestal constructed of 15-inch wrought-iron I beams, securely fastened. This pedestal forms the southerly bridge seat for the

next structure, which is a bridge of one hundred feet span, extending from the last described pier, over the tracks of the Old Colony and Newport Railroad, at an elevation of fourteen feet in the clear above said tracks, to a pier in Fort Point Channel situated about eight feet southeastwardly from the centre of said channel.

This pier is to consist of five cast-iron screw-piles of twenty-four inches internal diameter one and a quarter inches thick, so placed that two of them come directly under the ends of the adjoining arches on each side of the roadway, and one under the centre of the roadway.

These screw-piles are coated with a coal-pitch varnish, which has been in successful use for several years in protecting water-pipes from corrosion. The sections are joined by bolting the projecting flanches firmly together. They are to be screwed into the clay bottom until a firm and substantial bearing is obtained, and then the soft material is to be removed from the interior, and the pile filled with hydraulic concrete and capped.

Upon these piles, and connecting them at the tops, is to be a pedestal of wrought-iron I beams, fifteen inches high and $\frac{5}{8}$ -inch thick at stem, securely fastened to the piles, and widened, if necessary to receive the ends of the bridges properly, by brackets. Diagonal tie-bars four inches by $\frac{3}{4}$ -inch will connect the outer piles with the middle one.

The bridge of one hundred feet span, which rests upon the piers above described, is of the same style as the one above described over Foundry street, differing only in dimensions and proportions, and in the style of flooring.

The main girders or arches in this bridge are to be ten feet high from lower to upper chord, and are each to have a sectional area of fifty-six square inches from the arch and upper chord combined, and fifty-four square inches for the lower chord. The suspension-bars, lattice-bars, and ornamental castings,

and also the floor-beams or cross-girders are to be precisely the same as in the Foundry street bridge; but, instead of cast-iron plates, the flooring will be of wood, consisting of 8-inch by 4-inch Burnettized spruce timbers fitted between the iron floor beams, flush with their tops, and placed three feet apart on centres, to which is spiked an under flooring of 3-inch Burnettized spruce plank, upon which an upper flooring of 3-inch white oak plank is laid at right angles therewith, and spiked thereto.

The pivot drawbridge and pier are the next structures in order, and are located nearly in the centre of the channel. The openings for the passage of vessels are about forty-four feet each, and the whole length of the bridge is one hundred and sixty feet, and rests upon a central and two end-piers. The southerly end-pier has just been described; the northerly pier is of precisely the same description. The central pier upon which the bridge turns is composed of cast-iron screw-piles of the same dimensions of those already described. Sixteen of these piles are placed in the circumference of a circle of about forty feet diameter, being about eight feet apart, and three are to be set at the centre in a line with the current of the stream. Each of the outer piles is to be connected with the central ones at the top, and also at a level of eight feet below the tops of the piles by radial 6-inch wrought-iron I beams, firmly bolted to clasp-rings encircling each pile.

Similar I beams will also connect the outer piles with each other at the same levels, and diagonal rods crossing each other will connect the top of each outer pile with the lower clasp-rings of the adjoining piles. Upon the caps of the outer piles is to be a pedestal of 15-inch wrought-iron I beams, curved to form a true circle and securely fastened to the piles; and, to the top flanch of this beam, a steel-headed track-rail, weighing not less than fifty-seven pounds per yard, is to be bolted. Upon this track-rail rest

the wheels which support the turntable. These wheels are to be of cast-iron, chilled, sixteen inches in diameter, with a face or bearing surface six inches broad and truly coned to the radius of the circle. They will be placed about four feet apart. Radial rods, two inches in diameter, pass through the centre of each wheel, connecting it with a central hub eighteen inches in diameter. The outer ends of these radial rods project and pass through a curved wrought-iron band, four inches by $\frac{1}{2}$ -inch, which extends entirely around the circle just outside the wheels and keeps them always at equal distances apart and insures a uniform motion. A 6-inch wrought-iron pivot passes through the aforesaid hub at the centre, and extends downward through the cap of the centre pile, and three feet into the concrete filling; it also extends upwards and passes through a heavy cast-iron disc-plate five feet square, and one and one-half inches thick. Fastened to this central disc are to be radial 7-inch wrought-iron I beams, connecting it with a ring composed of 15-inch wrought-iron I beams, to the under side of which is bolted a steel-headed rail similar to the one above described. This ring is an exact counterpart of the circular pedestal before described, only it is inverted and the track-rail rests upon the tops of the wheels. Circumscribing this upper ring is to be a square frame of 7-inch wrought-iron I beams, firmly secured thereto at the points of contact, and also by means of the same sized beams at the angles. This square frame, with the upper ring, radial beams and central disc, all securely fastened together as described, form the turntable upon which rests the bridge. The towers, to the tops of which are attached the cables or suspension rods that sustain a portion of the weight of the bridge when swung open, are placed directly over the ring which forms part of the turntable, and exactly midway of the bridge longitudinally. These towers are to be thirty-seven feet

high, five feet by one and a quarter feet at the base, and twelve inches square at the top. The corner posts are to be 5-inch angle iron, connected either by plate iron or by lattice bars. The towers are tied together and braced, across the roadway, by three wrought-iron tubes or beams, of triangular section, five-sixteenths inch thick and of nine-inch faces attached at different levels, and connected together by vertical struts of 6-inch I beams. In the bays thus formed are to be diagonal rods, meeting in a ring at the centre, formed of bar iron three inches by three-fourths inch. The cables or suspension rods, which transmit a portion of the weight of the bridge to the towers, are three in number for each tower; the longest one being two inches in diameter, the middle one, one and three-fourths inches, and the shortest one, one and a half inches.

The construction of the bridge itself is the same as already described in the case of the one hundred feet span, except that the spans being only about eighty feet, the cross-section of the arches and chords is correspondingly reduced. The arches are to be of the same height (ten feet).

Within the space formed by the circle of screw-piles, and resting upon the lower set of radial beams, is to be a floor of 3-inch yellow pine,—the space to be enclosed and partitioned off to form apartments for an engine-room and a dwelling for the draw tender; or in lieu thereof, a suitable building is to be erected on the fender pier.

Two caloric engines, of not less than three-horse power and all necessary gearing for moving the bridge, to be furnished. Also, a wrought-iron stairway, with steps of yellow pine, will be built from the level of the roadway to the fender pier.

The fender-pier is to be two hundred and sixty feet long and sixty feet wide, and is to entirely enclose the draw-pier without being connected with it, thus preventing any shock caused by passing

vessels from being communicated to the draw-pier. In construction, this fender-pier is quite a novelty, and rather expensive as an experiment. It consists of three parallel rows of tongued and grooved sheet-piling of 6-inch spruce or pine, placed twenty-nine feet six inches apart from centre to centre of each row—the rows being in the direction of the thread of the current. Each row to be capped longitudinally with a cap twelve inches square tenoned to the piles every five feet, or oftener, if necessary. Cross timbers twelve inches square and thirty-two feet long, lapping each other at the centre, are to be bolted to the longitudinal caps and to each other at the lap joint. These cross timbers are to be placed six feet apart from centre to centre, and covered with a flooring of 3-inch spruce or pine plank. Suitable belaying posts are to be bolted to the longitudinal caps, floor-timbers and sheet-piling; and longitudinal oak ribbons three inches thick are to be fastened to the channel side of the sheeting-piling between low water and the top of the pier. Fender-guards of oak piles or sheet-piling are also to be built to protect the end piers of the drawbridge, and to extend out from said piers to meet the fender-guards which extend from the shore parallel with, and eighteen feet outside of, the bridge.

From the pier at the northerly end of the drawbridge is to be another bridge of one hundred feet span, precisely similar to the one of the same span already described. But the pier upon which its northerly end rests is composed of five screw-piles arranged like those already described.

From this last mentioned pier to Lehigh street, a distance of about two hundred feet, the structure rests upon wrought-iron columns, and is identical in every respect with that on the South Boston side already described.

The bridge over Lehigh street completes the list. It is of a clear span of fifty feet, of the same style of construc-

tion as the one over Foundry street, is to be twelve feet in the clear above Lehigh street, and its northerly end is to rest upon stone abutments, built by the city.

Before work was commenced by the contractor, borings were made at various points on the entire line of the extension. Eight borings were made on the South Boston side, which showed that the surface of the clay bed underlying the mud was about level with mean low water at Federal street, thence sloped downwards to the lowest point, which was on the easterly side of Fort Point Channel, near the tracks O. C. & N. R. R. At this point the surface of the clay was twenty-four feet below mean low water, in the centre of the channel it was eighteen feet below mean low water, on the westerly side eight feet, and thence to Lehigh street, it varied from eight to ten feet. Two of the borings were sunk into the clay with a view of determining its thickness and consistency at various depths. One of these borings was made at the point where the clay bed was most depressed. The total depth of this boring was ninety-five feet from the surface of the ground, and the clay was penetrated to a depth of fifty-five feet and was found to be of the very finest quality, entirely free from stones, gravel or sand, and, in point of consistency, appeared to be firmer and tougher near the surface, than at a greater depth. The other deep boring was made in the channel near the centre, and was carried down to the rock, a depth of one hundred and eight feet below mean low water, and through ninety feet of clay. The character of the clay was much the same as in the last boring, and, so far as the stability of the structures which are to rest on it are concerned, it was evident that nothing would be gained by penetrating the clay more than eight or ten feet. In view of the clay being softer than was anticipated, I suggested the addition of a broad exterior flanch to the screw piles at a point

eight or ten feet above the screw-blade to form a bearing shoulder on the surface of the clay when the piles were screwed into place. The suggestion was approved and is being carried out.

The construction of the fender-pier in the centre of the channel has been a very slow and difficult job, as might have been expected. It is, however, nearly completed. The screw-piles for the draw-pier are all in position and ready to be sunk. The iron columns on the South Boston side are nearly all set, and some of the 12-inch iron floor-beams are in position. On the Boston side, the pile foundations for the iron columns are all driven. Most of the iron-work and lumber is on hand and ready to set up as soon as the sub-structures are ready. The amount paid to date is \$174,388.

CHICAGO MEDICAL COLLEGE.

THIS is the name of a beautiful new structure to be erected on the corner of Twenty-sixth street and Prairie avenue, by a building committee of the Chicago Medical Society, composed of Edmund Andrews, M. D., H. A. Johnson, M. D., and J. H. Hollis, M. D.

It will be two stories, basement and French roof. The basement walls will be of Athens marble; the superstructure of Indiana pressed brick; the French roof to be covered with Pennsylvania black slate. The exterior dimensions are 60x100 feet, main front on Twenty-sixth street.

The interior arrangement will be as follows: Two lecture rooms will occupy three stories, and will be capable of seating six hundred, three hundred each; great care has been taken and much skill displayed in the arrangement of the amphitheatres, for the purpose of securing the best optical and accoustical effect, both as regards the professor and the student, and reflects great credit on the Architect, who though young in his business, is an aspirant to the highest attainments of his profession.

There will be two laboratories, one an analytical laboratory, capable of accommodating from twenty to thirty students, and located on the first floor and in the west end of the building, its dimensions being 54x35 feet. The other laboratory of the same dimensions to be located just below this one, in the basement. This department is to be devoted to pharmacy and toxicology. The former of these rooms will be supplied with all the modern minutia of such an institution, with a view to the convenience of both professor and student. As appendages to these laboratories there will be a large, light, and airy scale and apparatus room, and dispensing room opening off the analytical laboratory, but equally accessible to both.

Immediately above these rooms, on the second floor, will be a beautiful lighted museum, having windows on three sides, while above this still, and on the third floor, will be located the dissecting room, which from its character, needs no description. Suffice it to say nearly the whole roof above is given to sky-lights, which is a feature peculiarly valuable in such a department.

The centre of the building will be devoted to reception rooms and halls for the professors and students. When completed this will be a beautiful and attractive building, and one of which the profession of medicine will be proud, and one which will compare favorably with anything of the kind in the country. Its total cost will be \$30,000, and will be completed by the latter part of August, in time for the fall course of lectures. E. S. Jenison, Architect. Contracts not yet awarded.—*Real Estate and Builders' Journal*.

THE Home for Aged Men, just opened in Boston, covers 40,000 square feet between Worcester and Springfield streets. The estate was purchased of the city for \$50,000, and paid for by private subscription. There are now twenty inmates, with room for thirty more.

COMMUNICATIONS.

LANDSCAPE GARDENING. NO. 4.

BY H. W. S. CLEVELAND.

THE prevailing idea in regard to landscape gardening, among those who have paid no special attention to its principles, and, indeed, among many who profess to practice it, is that it consists mainly if not simply in the ornamentation of grounds. In a certain sense this is true; but according to the ordinary understanding of the phrase, it conveys a false idea of the object to be attained by a tasteful selection and arrangement of the natural and artificial features which may be made use of to give character and expression to a given area, be it large or small. To render a piece of waste ground attractive and interesting is indeed to adorn it,—but a lavish or injudicious use of decorations is very likely to produce a contrary effect, and result in a finical and unmeaning display of objects in which the effort to look fine, is so obvious as to be offensive to a refined taste. The true charm of a beautiful scene should be, and indeed *can only be*, secured incidentally, and as if without effort at display, and the difficulty of attaining this object is proved by the fact, that among the multitude of fine places on which money has been lavishly expended, it is comparatively rare to find one, which inspires an involuntary sense of pleasing emotions, which induce the visitor to linger and enjoy the scene, though it may comprise no single object which excites a feeling of wonder, or suggests the idea of the amount of labor and cost which have been expended on its construction.

Many of the showy places on the Hudson, in whose decoration fortunes have been spent, are utterly incapable of exciting the sense of refined elegance, and quiet unpretending beauty, which

is inspired by the simple, homelike aspect of Sunnyside, into whose arrangement the genial spirit of Irving seems to have breathed itself as effectively and with as little effort, as it has done in the pages of the Sketch Book. I do not mean to say that the characteristics of Sunnyside are such as are to be copied under all circumstances, but simply that its expression is maintained throughout with beautiful consistency, and is in perfect keeping with the refined and delicate tastes of its author, whereas many of the most costly places in its vicinity and elsewhere, are expressive mainly of the wealth of the proprietor, and his desire to show it.

Now, it by no means follows that no other characters, either of men or places, are worthy of imitation. Elegance and refinement are not necessarily inconsistent with wealth and magnificence, but they *are* utterly inconsistent with its ostentatious display, and when, as is often the case, the effort at such display is on a very limited scale, and a grand effect is attempted, where only puny results are possible, the only sentiment they can excite, except in very weak minds, is that of ridicule. Of this nature are almost all artificial imitations of natural objects whose attractive interest consists in the sense of grandeur they inspire. We may create artificial inequalities of the surface of the ground, which may seem natural, and may be made to conduce materially to the beauty of a limited area; but a miniature mountain can never be anything but an absurdity, serving only to show how contemptible are man's utmost efforts to create or imitate the sublimity and grandeur of nature. A brook may be checked in its

progress, and made to minister pleasantly to the senses of sight and hearing, by forcing its current over masses of stone, with an effect which is often seen in nature, but a miniature cataract is only ridiculous.

These are obvious truths to any but a very ordinary and uncultivated mind, and yet they are continually violated in practise to a greater or less degree, and the principle which they involve, and which is equally applicable to the use of whatever means are resorted to in the adornment of grounds, for the purpose of exciting any species of pleasurable emotions, is one which inexperienced practitioners find it very difficult to maintain.

The result is seen in the constant repetition of the same general system of unmeaning curves, and groups of trees and shrubbery, dotted in without regard to unity of design, or development of general effect. The work is often entered upon without regard to other object than the collecting and making a conspicuous display of as many showy and attractive features as the limits of the area, and the purse of the proprietor will admit, and the result is often utterly inconsistent with the style of the buildings, and the general character of the surrounding country, with both of which the grounds should be in harmony, or if circumstances render occasional incongruity inevitable, it should at least be concealed. The truth of this principle will be recognized by many, who would at once acknowledge their incapacity to carry it out in practise, while many others, who fail to perceive its meaning, will continue to create monstrosities, which are utterly offensive to the eye of taste. It is doubtless a wise provision of nature, that denies them the power of perceiving the errors they have committed, and allows them the gratification of the highest sense of pleasure of which they are capable, while on the other hand their works serve as a foil, to increase the pleasure which

the man of refined taste derives from the comparatively rare exhibition of their opposites.

If nature has furnished inequalities of surface, or any features which are in themselves either picturesque or beautiful, as woods, rocks, or water, they may serve to give the key note to the general expression, which it should be the effort of the artist to develop, and render apparent to the uninstructed eye. But suppose, as is often the case, that nature has made no suggestions. A bare piece of level ground utterly uninteresting in itself, is to be rendered attractive by artificial means.

Very many of the so called landscape gardeners would furnish a design for such a place, and be ready to publish it as a sample of their skill, without other requirements than an outline plan of the area, with the position of the buildings properly indicated, and the plan would comprise an arrangement for a carriage entrance, and a series of paths, squirming over the ground in a great variety of fanciful curves, between which would be inserted clumps of evergreen, or deciduous trees and shrubs, beds of flowers, arbors, fountains, vases and rustic seats, any of which are legitimate decorations when appropriate to the place, but on that point the whole question of their use is to be determined, and if their use is desirable, then the question of their disposition is the one on which the final effect of the whole is dependent.

If the residence is of an imposing, or a highly ornate style of Architecture, the use of artificial ornaments of a kindred style, such as architectural terraces and fountains, vases, statues, etc., is justifiable in its vicinity as a means of connecting it with the more distant portions in which the introduction of such decorations would be inappropriate. Their indiscriminate use is always to be condemned, and in the case of a simple and unpretending mansion their presence is manifestly incongruous with the gen-

eral expression which should be preserved. Of this the house itself must be the criterion. If the grounds possess natural features indicating the general character which should be preserved in their arrangement, then the house ought to correspond in its Architecture to the prevailing expression. On a level plain such as has been supposed above, it would be manifestly inconsistent to erect a building whose outlines were frequently broken by projecting and acute angles, which belong rather to the picturesque character. It should be expansive and imposing, and its lines where they vary from the horizontal or perpendicular, should be gently sloping or gracefully curving, and in the arrangement of the grounds and the selection of its decorations, whether natural or artificial, the same rule should be observed.

In my next article I propose to consider the application of this rule, but I wish beforehand to forestall the verdict which inexperienced persons are apt to pronounce against all rules, that their only tendency is to produce formality, and destroy the natural grace and ease, which they think is only to be secured by disregard of rules. Precisely the reverse of this is true, and the reason we

so rarely see a really fine effect, or series of effects, is because the work has been done without any leading principle or unity of design.

Chicago, Ill., April, 1870.

BUSINESS IN THE EAST.

WORCESTER, Mass., there are three churches in contemplation of construction here this season.

One for the First Methodist Society, S. J. F. Thayer, Boston, Architect, will be built of brick, with stone trimmings, and cost about \$55,000. One for the Third Methodist Society, Messrs. Earle & Fuller, of this city, Architects. One for the First Universalist Society, Tourtelott & Cherrington, also of this city, Architects. These are each to be substantial structures, built in good architectural taste; and when finished will add much to the church architecture of the city, in which it is now very deficient.

The people of Southboro' have lately finished a new town hall, at a cost of about \$27,000; and in Marlboro', a substantial brick hall is nearly completed, to be used for town purposes, which will cost about \$80,000; of the latter, S. S. Woodcock of Boston, is the Architect.

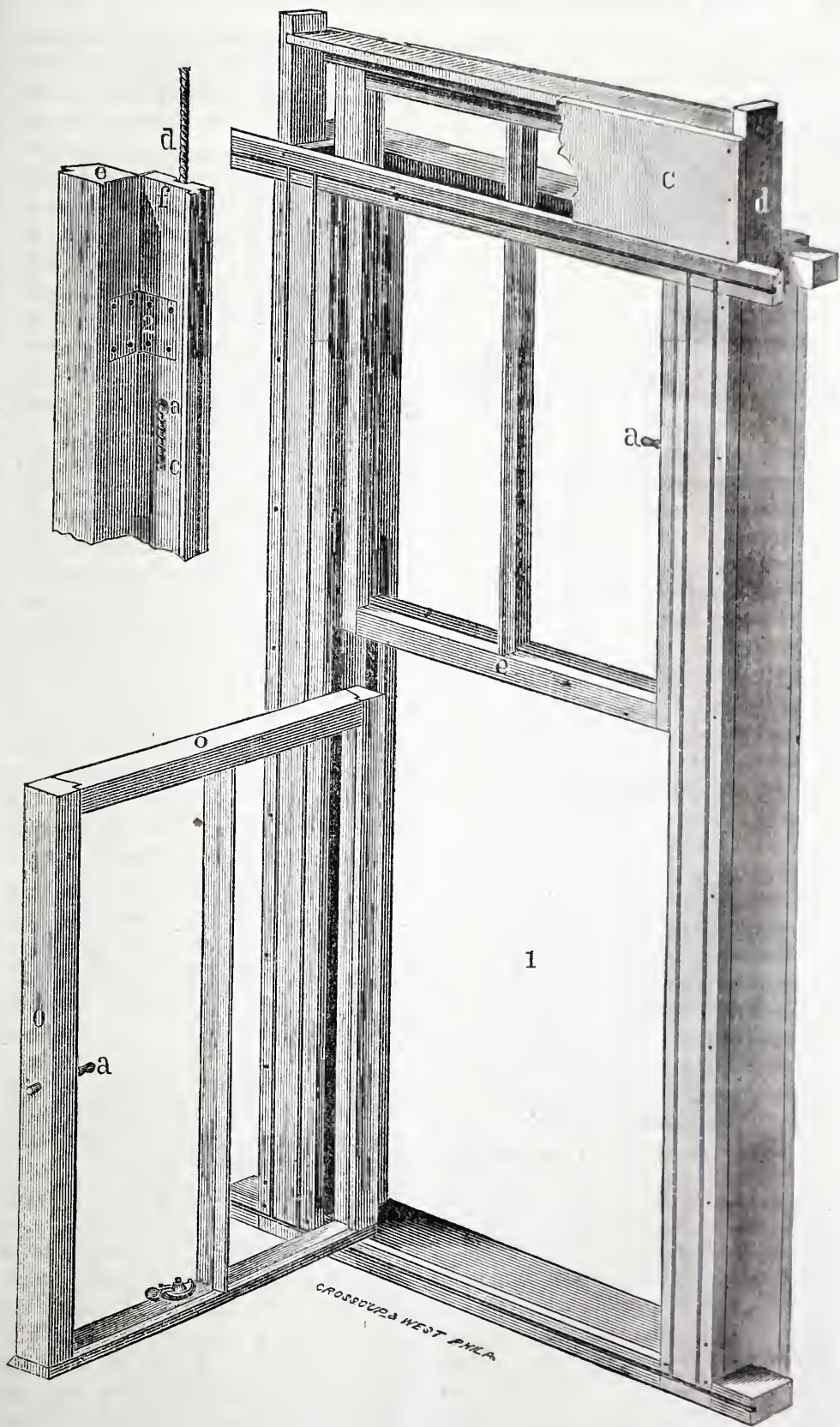
Worcester, Mass., April, 1870.

HOUSEHOLD ECONOMY.

TILL'S IMPROVED WINDOW.

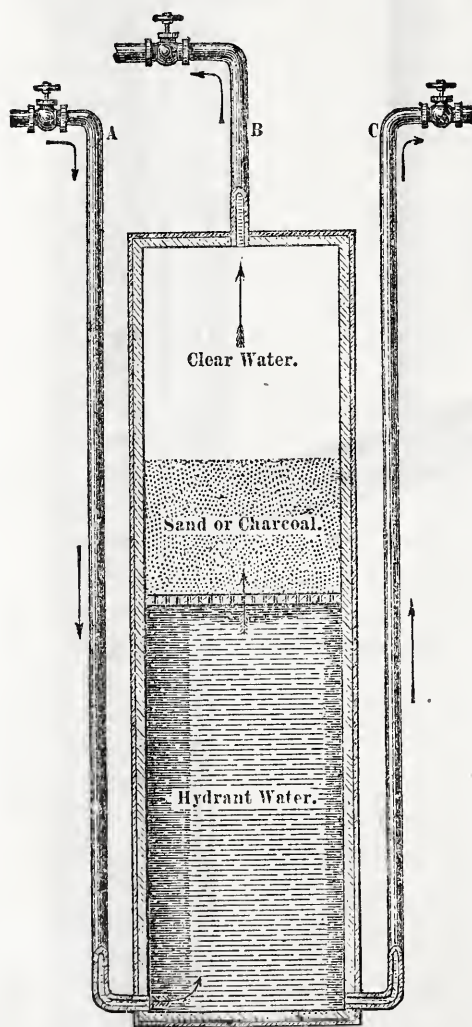
AS will be seen by reference to the engraving opposite, the object of the inventor of this improved sash frame, was to combine the advantages of "ordinary box windows hung with weights," and the swinging of the sash in so as to allow of ready access for cleaning, reglazing, etc. The weights are attached to slides, on one side of which the sashes are hung with hinges, and on the other, are connected by catches marked a, a, in the cut. Above the frame there is a pocket, into which either sash can be raised, permitting the other to be

brought down and swung into the room, without the removal of any bead or fixtures. From the facts before us, and the array of testimonials presented, we can but think the proprietors have brought before the public a valuable improvement, and one that will take fast hold on the building community; that it is a desirable attainment need not be said as every housewife, who has twice a year to risk her own or her servant's life, by the very awkward process of cleaning windows, sometimes practised, or to tear out the beading all over her



"TILL'S IMPROVED WINDOW."

house, each time, thus fatally injuring the appearance of the woodwork, will immediately decide. It was patented November 2, 1869, and is owned by Wells, Till & Butler, Sandusky, Ohio, who will doubtless furnish any further information concerning it that may be desired.



A COMBINED FILTER AND COOLER.

AS we have had of late several communications relative to the process of filtering, chiefly from denizens of the Western country, where pure water is sometimes impossible to obtain, and as it is also important to the large cities where water is furnished at wholesale, and consequently (it would seem like the "big jobs" natural to the age), is often considerably adulterated, we have

obtained an illustration of a "combined filter and cooler," which seems to have many advantages. It is to be set either in the ground or in the cellar, where the temperature is low, and as one of its objects is to do away with ice, which there is no doubt is injurious to health, being generally imported from one locality to another, and having an effect similar to drinking strange water, it is recommended to place the filter some fifteen feet below the surface of the ground, where the temperature is about 53° Fahrenheit, and if the water is allowed to remain there for a few hours it becomes cooled to same temperature, which is 27° below the average hydrant water in summer time. The vessel is made of Terra Cotta, or boiler iron lined with cement, and its structure will easily be understood: the pipe A, conveying the water from some adjacent cistern, which is afterwards drawn off through B, having passed through a sieve filled with sand and charcoal. The pipe C, is for the removal of such particles of mud and other substances as would settle or fail to pass through the charcoal, and is operated by opening both cocks attached to pipes A and C, when the sediment would pass off in a few moments. It is claimed for this patent, that it will cool and clear from ten to twelve buckets per day. Louis Scharff, Spring Mills, Pa., is the inventor and manufacturer.

CLEANING MARBLE.—Marble may be cleaned by mixing up a quantity of the strongest soap leys with quicklime, to the consistence of milk, and lying it on the marble for twenty-four hours. Clean it afterwards with soap and water. Or else use the following: Take two parts of common soda, one part of pumice-stone, and one part of powdered chalk; sift through a very fine sieve, and mix with water. Then rub it well all over the marble, and the stains will be removed. Then wash with soap and water as before, and it will be as clean as it was at first.

A PAPER READ BEFORE THE CINCINNATI CHAPTER, A. I. A.

AT a regular semi-monthly meeting of the Cincinnati Chapter of the American Institute of Architects, held April 5th, Mr. Edwin Anderson was called upon, and read the following very interesting paper upon the "*Architecture of America*."

"There are three great causes which produce the architecture of a nation, and in proportion to the strength of either of these causes, or the strength of their combinations, we find the architectural monuments of the world as pages of history telling us of the laws and characters of those who erected them.

"The causes referred to are form of government, religion and wealth; and, believing them to be the producing elements, let us examine them as they exist in this country, and, if possible, draw such rational deductions as will enable us to follow our vocation with success, and avoid those hidden rocks on which our ambition and hopes may be stranded.

"We are a nation of individuals—each a king and a high priest unto himself, having neither concentrated political power, unity of religion, wealth or tongue, with these facts clearly impressed, we are enabled to trace and measure the strength of the producing powers, from the single individual, through all combinations of individuals, to the national or political power.

"Private architecture is but a reflection of the character, condition and enterprise of the individual proprietor, and the result is a great variety of structures having the same purpose.

"The identity of a proprietor with his proposed improvement is so well understood that American Architects admit the fact without argument, that the combination of structures with their purpose are so closely interwoven that to foreign authors they become subjects of unfav-

orable criticism, because of the unwillingness of such authors to admit truthfulness as an element of æsthetics, unless it has its prototype among the works of their own country.

"The principles of true art are unchangeable, and in their application American Architects have but little regard for precedent.

"The feature of an active, living present, pervades the entire fabric of American society, and by its strength gives character to the works of the day and generation.

"We are thus justly accused of building only for the present, and not for all time. We acknowledge the fault, and claim it a just one, for the works of one generation are the extent of their ability and supplanted by those of a succeeding generation, revised, corrected, and adapted to the demands of the day, without the loss of a single antiquarian tear.

"Structure erected by religious congregations or business corporations, have that same identity with their proprietors which has been referred to in connection with private enterprises.

"The desires and demands of church congregations are always in excess of their ability to pay, and the result is that unfinished structures and sham features are numerous.

"The quality and quantity of our public structures are limited by the strength and perpetuity of the political party under whose auspices they were inaugurated, for it is a condition equivalent to a law of nature that those out of power must oppose the works of those in power.

"The conception and development of works of such magnitude as the Central Park and City Hall of New York, was caused by the assurance of continued political power, and without this continued political power to complete an

undertaking many grand projects will pass to succeeding generations in an unfinished condition, and it is a safe conclusion that the State Capital at Albany, New York, will furnish an example.

"As long as our Republic exists our public works will bear an unfavorable comparison with those of autocratic nations, but while we suffer in this direction we have more than ample compensation in the fact that in all that appertains to private enterprise we are their superiors.

"With reference to the profession in this country, it may be said that the peculiar surrounding circumstances which have been noted, are such that its prominence is lessened and its usefulness impaired in comparison, but the efforts of earnest and talented co-laborers in combination with an intelligent com-

munity, have placed the worthy in a position where they can fairly receive their reward.

"The object of this paper has been to briefly call attention to a few principles and facts, to the elucidation and discussion of which the members of this chapter and others are respectfully invited."

Mr. Wilson then read a long and very able paper upon the objects of the chapter. He presented many useful suggestions in regard to the best mode of conducting it in order to make it subserve the purpose intended; and to produce a proper spirit of emulation among the members of the profession.

An interesting discussion ensued, in which Mr. Anderson, Mr. Wilson and Mr. Nash took a part, after which the Chapter adjourned.

WHY PHILADELPHIA GROWS.

IN the following article the *Burlington Gazette* (N. J.) ably discusses the growth of Philadelphia, and however widely some may differ from the editor's conclusions, all will be interested in his arguments. He says:

"It is a common thing to hear of a single builder erecting from one to three hundred houses in Philadelphia in one season. There are many mechanics all the time at work in the same way, building from one to ten blocks annually. The wonder is how these men command the means to carry on a wholesale business requiring so much capital, when it is known that most of them have their fortunes to make. But the trade of housebuilding in Philadelphia has undergone a total revolution within the last twenty years, the results of which are seen in the gigantic scale on which individual builders operate.

"Capital now combines itself with labor more freely than it did in former years. The owner of a tract of land large enough

to contain, say one to four hundred houses, lays it out in streets and lots, and advances in cash sixty per cent. of the cost of building from one to ten block of houses. The builder may have some capital of his own, and this, assisted by the credit he can command for work and materials, enables him to finish the houses. When completed, the owner of the lots conveys the property to the builder, reserving an annual ground rent on each house, equal to the interest on cost of lot and the cash advanced. The principal of this ground rent cannot be called for by the holder so long as the annual ground rent is kept paid up, yet he is bound to receive the principal whenever tendered. A ground rent thus differs very materially from a mortgage, this difference being so strongly in its favor as to make houses encumbered with ground rents much more saleable than those encumbered with mortgages.

"The builder being now in possession of his houses, proceeds to retail them to

the public, or pays with some of them to, the various mechanics who have contributed their labor and materials on the job. The latter also proceed to sell their houses. The ground rent is so large a part of the whole price, that the purchaser becomes the owner on payment of only a moderate sum, about one third. Hence selling goes on rapidly, there being thousands of persons in Philadelphia who are ambitious of being their own landlords. So active has been the demand that these wholesale builders have had no difficulty in finding quick sale for block after block. A prompt return of their capital and profit enables them to be continually repeating the operation on a still larger scale.

"Buildings erected in this way are known as *bonus* houses; that is, because the owner offers the builder a bonus in the shape of so much cash loan on each house, as an inducement for him to convert vacant lots into interest bearing securities. The landlord having thus converted his lots into ground rents, proceeds to convert them into money, and this money he again lends to the builder on new blocks of houses. By this combination of the capital of one man with the labor of many others, Philadelphia has of late years been growing with extraordinary rapidity. The extension of street railroads in every direction has caused hundreds of acres of outlying lots to be covered with neat houses at moderate cost. The building of these houses pays a handsome profit for they are built by wholesale and sold by retail. As the business is a safe one, it has attracted a large capital in prosecuting it. It is believed that not less than twenty millions of dollars are kept constantly employed in this way, paying a clear profit of twenty per cent.

"In a city like Philadelphia, the greatest demand is for houses having six to eight rooms, with modern conveniences, and for neat smaller houses at \$1200 to \$1500 each. A workingman with a few hundred dollars saved up, can easily

secure such a house, as about two-thirds of the price are on ground rent, which he can pay off when it suits him. Thus the ground rent system has been a powerful agency in promoting the growth of Philadelphia. Another equally encouraging agency is found in the multitude of building associations. There are about 1200 of these in that city, lending about fifteen millions of dollars annually to the members purchasing houses, mostly to clerks, workingmen and workingwomen. With stimulants like these we have mentioned, it is no wonder that Philadelphia grows at her present enormous rate. Some two square miles of ground are annually covered with buildings, every little family occupying its own house. The wholesome vitality that pervades this vast movement in real estate has its origin in the immense manufacturing industry of the city. This industry gives work and wages to thousands of families who earn enough to purchase houses. But strike down our protective tariff, and all industry will become paralysed. With no industry there will be no wages, and without steady wages there will be no surplus earnings with which to buy even moderate houses. The prosperity not only of Philadelphia, but of the entire nation, rests on the foundation of a Protective Tariff."

NEW COLLEGE.—The town of Carthage, Ill., having been selected by the Lutheran Synods of the West as the place for their new institution of learning, its citizens have voted to put up a substantial college edifice of stone and brick, to cost \$25,000. They had already given a site of seven acres covering a handsome swell of the prairie, which, for beauty, drainage, health, and accessibility, is not surpassed by any other spot of the same extent in the vicinity. Whether alive to the interests of education or not, the Carthaginians are certainly alive to the interests of their town.

CIVIL ENGINEERING AT THE TIME OF CHRIST.

EXTENSIVE surveys of the Island of Britain were made by the Roman Agrimensores (county surveyors), who availed themselves of the ancient Druid, barrows of Wiltshire, and other artificial structures erected before the Roman conquest, as points to and from which to draw their base lines. Mr. Black announces this curious fact in his paper on the Geometric Use of Ancient Mounds, read before the London Antiquarian Society, and gives the proofs of his assertion in his edition of the Antonine Itineraries, prepared under the direction of the Master of the Rolls.

The Roman genius for construction was the grandest the world has seen. The traveller who visits the cathedral fanes of York and Bourges, Burgos and Seville, Cologne and Milan, the castles of Windsor and Heidelberg and St. Elmo, the temples at Paestum, at Athens, at Baalbec, and at Thebes, the palaces of the Maharajas, on the banks of the Ganges, sees monuments of splendid beauty, unsurpassed in any age, by any people; yet he returns to Rome, and says, while standing upon the vaulted ruins of the Baths of Caracalla, or while counting his steps across the floors of Constantine's Basilica, or while looking down from the uppermost tiers of seats into the arena of the Coliseum, that the constructive genius of all the rest of the world must bend before the Imperial Latin Engineer.

Never but once were thus combined in the political situation of a city, all elements needful for carrying up the culture of mere building talent to the highest pitch, while at the same time were offered unlimited opportunities for its exercise. Rome was a seaport; backed by a country fertile in supplies; a peninsula of mountains made of marble; in the centre of a vast sea; crowded with well-settled islands, and girt about

with coasts inhabited by the oldest, richest and most advanced communities of man. The Roman States were still physically undebauched; in the prime of its strength; irresistible lord of all the Western and half the Eastern world; was infinitely rich; irresponsible and unscrupulous; proud and vain; sensual and sensational; loving war only for the sake of its fruits, and preferring peace for the sake of its enjoyments. The Bath-house was the church of Rome; combining the essential qualities of the Exchange, the Club, the Museum, the Bar-room and the Polls. The Emperors enriched themselves and confirmed their power by watering their political stock. Caracalla could afford his horse a golden manger in a temple of its own, after affording his fellow-citizens a Bagnio as large as the Tuilleries, in which ten thousand bathers could enjoy themselves at once, the ceilings of which were eighty feet high, the partition walls as massive as the abutments of a bridge. The sweating-room alone was larger than the Catholic Cathedral in Philadelphia; and surrounded by arcades, inside, of costly Corinthian columns, the abstraction of which by the mediæval princes of modern Rome, for use in the construction of their private palaces, brought down the ceiling with a crash which shook the city as far off as the Castle of St. Angelo.

St. Peter's is built on the model of these ancient monuments. Its nave is precisely of the size and shape of the great room in the Baths of Diocletian and of the name of Constantine's great church. Its dome is precisely the size and shape of the Pantheon, which, as is now well known, was yet another Imperial Bath-room, since then appropriated to the uses of religion—merely a change from hot to holy water. The great Bath-room of Diocletian is also one of the grandest churches of modern Rome.

The necessity for supplying an amphibious population with floods of fluid, developed the civil engineering talents of the Empire. Scores of aqueducts were constructed above ground to bring the waters of the Appenines into the city, and an elaborate system of sewerage carried it away again to be repurified in the bosom of the Ligurian sea. While Signor De Rossi has been excavating the ancient Catacombs outside the walls; and the Government Antiquarian, Baron Visconti, the ancient marble yards and police stations inside the walls; and the Emperor Napoleon, the foundation rooms of the Palace of the Cæsars; the British Archæological Society of Rome has been digging along the foundations of the ancient walls themselves, and opening up the underground water-works, reservoirs and sewers of ancient days. They have determined the true site of the fountain of Egeria and of King Numa's Palace; how Royal Rome, Republican Rome, and Imperial Rome, were in succession fortified with longer and larger circumvallations; and how the water pipes of the engineers of the Middle Ages were ranged within and upon the conduits of Servius Tullius and the Tarquins. Any Civil Engineer who is curious in such matters, or would like to see nice pictures of the rubble work of his predecessors in the profession, twenty-two centuries ago, can gratify himself by looking over Mr. Parker's "Notices of Recent Excavations in Rome," just published in Part I. of the forty-second volume of the *Archæologia*. By-the-by, Mr. Parker's little hand-books of Architecture are not only indispensable for the tourist, but ought to be in every American gentleman's library. And it is worth knowing, also, that the Archæological Society which the foreigners in Rome keep up, has upwards of a thousand special photographs of Specimens of Roman Construction, arranged in the order of time.

The first part of this interesting collection is already for sale, and illustrates the historical construction of walls in a

series of sixty-four examples, beginning with the wall of Romulus, 750 B. C., and taking on the average one for each generation. The series is continued down to the 13th Century A.D. In the time of the Empire the dated examples are so numerous that they are necessarily subdivided; afterwards the churches and monasteries supply us with a continuation of the series. This is really a great work for the history of architecture, such as has never been done before. Even D'Agincourt, in his admirable work, overlooks construction, which is the foundation of all. It is sometimes impossible to get photographs from nature for want of sufficient space, and it is generally necessary to fill up the excavations again immediately, so that plans and drawings are the only mode of showing what has been made out; but photographs are made of these and sent to the Oxford Architectural Society.

When will we have in Philadelphia an Architectural School, liberally endowed by private munificence, furnished with a splendid library, folios of drawings and photographs of all the Monuments of all ages, and taught by artists of merit and learning, and by engineers of rank, genius and experience?—*R. R. Journal and Mining Register*.

NEW CHURCH.—A mass meeting of the members of the various Baptist churches throughout the city of Baltimore was held recently in the First church, in aid of the Eutaw Place church now in course of erection. It is to cost \$100,000 of which \$90,000 had already been subscribed. In the enthusiasm of the meeting three gentlemen rose and subscribed \$5,000 each, two others followed with \$1,000 each, and other amounts ranging from twenty-five to five hundred dollars were promptly subscribed, aggregating the handsome sum of \$25,035.

THE Prince Imperial of France has made a little marble bust of the Empress.



EDITORIAL ITEMS AND CORRESPONDENCE.

PROF. CLEVELAND's ideas of taste are so concisely and aptly expressed in the series of essays on "Landscape Gardening," which he has furnished us at different times, that we feel like giving him the sobriquet of *American Ruskin*, though to our knowledge he does not "mix colors," yet his art is not less than that of the great painter, and although his essays may not have the poetical phraseology of *l'homme anglais*, we think perhaps his style is therein an improvement. The subject he handles is of interest to all classes. The professional man who does not understand the importance of erecting his structures of every description in accordance with the principles and freaks of nature that surround him, will fail of the effects he intended and oft-times lose his reputation as well as his study. This, however, seldom occurs in this country, where, we must to our sorrow confess, the principles of taste are popularly so little known, hence the necessity that *all* should read on the subject, and though we might ourselves spin out several pages in commendation of both the subject and its treatment by our correspondent, we feel that, under the circumstances, it would be superfluous.

BUSINESS among the Architects in the West is looking up. We notice in the *Wisconsin Journal* that Col. S. V. Shipman, the Architect of many of the public buildings in that State, is the Architect of the new Illinois Hospital for the Insane, and has also obtained the com-

mission for plans, etc., of a similar institution in Iowa, and a friend writes us from Springfield, Ill., that there is to be a large watch factory built in that place to cost about \$18,000, and a Methodist Female College, at Jacksonville, to cost \$40,000. Also, that Mr. W. W. Boyington's (from Chicago) designs have been accepted for the Iowa State Capitol building, and that through Kansas and Missouri, the demand for carpenters is very great.

THE *R. E. and Building Journal*, of Chicago, gives a resume of prospective and actual building operations in that city, by which we see that they are to have a pure Gothic church edifice for the St. John's Episcopal congregation, designed by Mr. Cass Chapman. Several large brick blocks and private residences, many cottages, store-houses and stores, all in the hands of different architects.

THE *Davenport* (Iowa,) *Democrat*, notices improvements in the jail in that place, and is responsible for the witticism which immediately follows:

"The much needed improvements at the jail are likely to go forward now with dispatch. The contract for enlarging that structure was awarded on Saturday afternoon to Alderman Thos. W. McClelland, who will at once proceed to the execution of the work. The plan is to add one story with a Mansard roof, which will be divided into five apartments, one being especially designed for the benefit of juvenile offenders. Alterations in the jail in the way of improved ventilation will be made. The cost will be not far from three thousand dollars, and is to be completed by June 15th. Mr. W. L. Carroll, Architect, prepared the plans."

A SEVEN years older, who is going to edit a paper when he gets big enough, handed in the following item to day:—

"*Hurt*.—Some time ago, before school took up, me and another boy went out to the grove and fell a hundred feet and took away his breath."

THEY have a school of Arts and a school of Industry in Sidney, Australia, of the former the "*Sidney Mail*" thus speaks.

"It must be gratifying to all to find, in the face of commercial depressions and the attractions of a free and other libraries, that this useful institution is still flourishing, the number of members for the past year having been greater than during any previous. The officers appear fully alive to the wisdom of extending the usefulness of the institution, in the formation of extra classes, among which are classes for the study of geology, mineralogy, civil engineering, architecture, etc. Besides the library of new works by the most popular authors, the use of a commodious reading-room (as also the admission of members at reduced rates to most of the entertainments given in the hall), and the numerous other advantages to be derived, cannot fail, we should think, still to secure a large number of subscribers."

ARTISTS, architects, land surveyors, and all who have occasion to make use of tracing paper in their professional duties will be glad to know that any paper is capable of the transfer of a drawing in ordinary ink, pencil, or water colors, and that even a stout drawing paper can be made as transparent as the thin yellowish paper at present used for tracing purposes. - The liquid used is benzine. If the paper be damped with pure and fresh benzine, it at once assumes a transparency, and permits of the tracing being made, and of ink or water colors being used on its surface without any "running." The paper resumes its opacity as the benzine evaporates, and if the drawing is not then completed, the requisite portion of the paper must be again damped with the benzine. The transparent calico, on which indestructible tracings can be made, was a most valuable invention, and this new discovery of the properties of benzine will prove of further service to many branches of the

art profession, in allowing the use of stiff paper where formerly only a slight tissue could be used.—*Ibid.*

THE following is also from the same, and serves to show the variety of wood grown there:

COLONIAL WOODWORK.—Mr. Bernasconi has made, to the order of Rear-Admiral Hornby, a very neat glove box of Australian and New Zealand woods; the top is composed of triangular pieces of tulip wood, cabbage tree, tarura, Huon pine, yacca, and honeysuckle; the front and sides are veneered with mottled cedar, and the inside is lined with solid myall, which imparts a delicate fragrance to the articles contained in the box. It is a very neat piece of workmanship.

THERE are to be commenced in this city during the coming season, new University buildings, a new Corn Exchange, two new markets, several palatial residences, a building for the Academy of Natural Sciences, and a bridge across the Delaware.

SUBTERRANEAN passages across the Boulevards are about to be constructed in Paris, so that foot passengers can pass over without danger from the throng of vehicles. The entrance to the stairways will be through kiosks, like those now constructed along the Boulevards for the sale of newspapers. The privilege of constructing these passages has recently been granted by the French Government to a competent Architect.

THERE is now an unbroken line of street lights in New York, extending from the Battery to Tremont, Westchester county, a distance of sixteen miles.

AN artisan from Montreal, Canada, has the contract for putting the new grand windows in the Episcopal Church at Beverly, N. J.

THEY have formed a class in the University of Pennsylvania, for the study of Architecture and Drawing of which Mr. W. T. Richards is the instructor.

WE would like to furnish our readers with the name of the Architect of St. Mary's Church, New Haven, which we illustrate this month; but as it was not sent us we must content ourselves with expressing our desire to have another chance to give it to the public.

BOOKS RECEIVED.—The "Monthly Report of the Department of Agriculture," from R. T. McLain, and Vol. 5 of the Library of Education, entitled "The Bible in the Public Schools," being a full treatise on this important subject, giving the views of the leaders on both sides, and leaving the reader to make up his own mind on the question. This series of books should be in the hand of every person interested in popular education, (and who is not?) they are full treatises on different branches of the subject, and sell for twenty-five cents each. J. W. Schermerhorn & Co., 14 Bond street N.Y.

THE MECHANICS' AND TRADESMEN'S SCHOOL AT N. Y.—The closing exercises of the Evening School of the Mechanics' and Tradesmen's Society for the present term were held lately at the school-rooms, No. 472 Broadway. The school is open to all mechanics' apprentices, and is doing an excellent work among them. It is now in its fourteenth year, and has four hundred and fifty pupils. These are instructed in such branches of drawing and designing as will tend most to assist them in their respective professions. Mechanical and machine drawing, and all kinds of architectural and mathematical work come within the scope of the institution. Graduates of this school may be found in charge of some of the largest designing rooms in the city. The school has been in charge of Mr. H. H. Winans, to whom the credit of its success is chiefly due. Among the gentlemen present last evening were Peter Cooper, James W. Gerard, Messrs. Ockershausen, Patterson, Gedney, and others of the Committee. A very large number of the drawings which have been made during the term were exhibited, and

speeches were made by a number of gentlemen, interspersed with music. At the close of the entertainment, diplomas were awarded to twenty-five students, who have completed a five years' course in the school, and certificates of excellence were given to sixty others, whose tasks have been specially well performed. The hall was crowded during the evening by an interested audience of all ages.

MESSRS. EARLE & SONS, 816 Chestnut street, have refitted their establishment, in most elegant style, (which it will be remembered was burnt down last fall). Two art galleries are arranged on the first floor, and open into each other by folding doors, affording the opportunity when occasion requires to be thrown into one grand saloon. These are both lighted by large sky-lights, box shaped and highly ornamented, thereby serving two purposes, and are a great improvement over the second floor gallery, formerly in vogue at this place. These gentlemen are doing a large business in frames, looking-glasses, etc., as well as pictures and works of art generally. Of their new importations we notice some rare gems, the most prominent were, the "Scene in the Kaatskills," a grand perspective, wherein forest trees, a streamlet, rocks, and sunlight are made to do duty for the pleasure of the eye, by the masterly hand of Webber; "A View of Rome," by Geo. L. Brown, in which the ruins of the coliseum, occupy the foreground. St. Peter's, the Castle and Bridge of St. Angelo, and the Vatican, all being represented, though deficient in architectural detail, as must necessarily be the case on canvass taking in a view of the entire city; and "A Young Girl of Morocco," by C. Baun, a very spirited picture, representing a good natured lass, in quaint costume, playing on an instrument similar to the tambourine, its principle merit, to those unfamiliar with the costumes of that sunny land, is the expression of countenance, which the artist has succeeded in making very natural.

The "Yosemite Valley," and "In the White Mountains," by Thos. Hill, are on sale here, and are admirable productions, and so we might say of many others had we space to devote to the minute details of art-criticism, we might fill a book; but we must mention before leaving this abode of the muses (late literally so), a picture styled "Maternal Happiness," by Rudolph Epp,—not being naturally disposed to mawkish sentimentality, nor lately the father of wonderful progeny, much less the mother, we can yet appreciate genuine feeling, be it between romantic youths of both sexes, or the more steady and intense affection of the mother towards her child, this latter Mr. Epp has most beautifully expressed in his picture. A happy babe, its face sparkling with glorious innocence and mirth, and a mother, with face all aglow with satisfaction. After all, what is there in a landscape can compare with the infinity of thought as expressed in an intelligent countenance; such is this mothers, and studying the features, not only love but prospective wealth and honor, with all the attendant circumstances of a life's struggle are beaming in that one comprehensive glance. The subject is one that will touch many hearts, and it is surprising that the picture has remained this long in market.

Another, by Hobertson, represents a maternal scene in another variety of life; a Pheasant with her brood in a blackberry patch, full of life and animation,—this little gem will attract the praise of all who see it.

Apropos of Art, Mr. Haseltine has been disposing of some valuable pictures at auction for the purpose, it is said, of closing his business, preparatory to a tour in Europe. We noticed a handsome picture by Frederick Church, sell at the low price of \$560, and as the sales have continued over some weeks there have probably been some of the greatest bargains in that line our citizens have had an opportunity to effect for years.

Messrs. Viti Bros., have had several

large sales of marble statuary lately, in which were included many works of merit.

EDITORS OF THE ARCHITECTURAL REVIEW.

The enclosed sketch represents a "key holder," being a device for safe keeping of the key of a door, an article which every body knows is so apt to be lost or mislaid.



It will readily be perceived that an oblique sheath is inserted in a rabbet in the thickness of the door located above the mortice lock. A face-plate is screwed on, as shown in the cut.

Will you please say in your correspondence department what you think of its value, and oblige.

CARP.

Ottumwa Iowa, April, 1870.

ANSWER.—We consider it a very neat and useful attachment to a door, and

one the cost of which is so small as to ensure a general patronage for it.

EDITORS OF THE ARCHITECTURAL REVIEW.

SIR: As I am engaged in the study of Architecture, I wish to obtain works on the Sciences of Optics, Perspective, Light and Shade, and Acoustics, as recommended in the REVIEW. Will you please inform me through the REVIEW which are the best works on those sciences, and where I may obtain them, and oblige,

Yours, E. E.

It is much to be regretted that we have not as yet hand-books adapted to Architecture or any of these subjects. All are too expensive or too abstruse in style, and on the subjects inquired for above, generally devoted to the use of other sciences. However, we recommend our correspondent, and all others in search of scientific works, to send to D. Van Nostrand, 23 Murray street, New York, A. J. Bicknell & Co., Springfield, Ill., or to H. C. Baird, of this city, for their catalogues, in which may be found a list of the best works on architecture and kindred sciences.

A. A. C., Martinsburg.—This correspondent applied to us some time ago in reference to the best mode of hanging church window-sash, especially as applied to the Gothic style; and, as we proposed to illustrate the subject then, we deferred our answer. We will on a coming occasion enter at large into the subject of windows, as applied to ecclesiastical Architecture; at present we will merely say, in reply to our correspondent, that they may be either hung on hinges to the jambs and shut against the mullion; or, they may be hung on pivots in sections. Such sections are sometimes balance pivotted, that is they have their pivots at the centre; and some have their pivots at the top; while some again have their pivots at the bottom, or near it. In these two latter cases the sections must be prepared so as to open in or out, and shut against

the stops, in as weather-tight a manner as possible.

LEARNER, Washington, D. C., is referred to our February number for the tints to be used in drafting. The shades are put on either in India Ink or Payne's Neutral. The former is the better of the two. Draftsmen are divided in opinion as to whether the shadows should go on first or last. There are good reasons on both sides. The diameters of columns placed order-over-order must be all alike.

A. H., Stratford, Canada.—We cannot better answer your enquiry than by giving the subject of "flat roofs" an exhaustive review, which we propose doing soon.

"A SUBSCRIBER," Pittsburg, Pa., is informed; 1st, that his suggestion shall receive attention; 2d, that communications from practical mechanics, stonemasons, carpenters, painters, etc., will be most acceptable, none need fear the criticism of their articles as we will see that they do not go to press uncorrected as to grammar and spelling. Send on your ideas, as they are what we want.

"BICKNELL'S VILLAGE BUILDER," is provoking considerable comment by the press all over the country. It is as we have previously said, a very valuable work, and we hope it may meet with the large sales it merits. Its title conveys an idea of its contents, but it can only be appreciated by personal study. A. J. Bicknell & Co., publishers of practical books of all kinds, at Troy, N. Y., and Springfield, Ill., deserve, not only the thanks but the patronage of the public, for whom they have brought out many valuable helps to scientific knowledge.

The Land Owner of Chicago, in speaking of Fairmount Park of this city, gives us credit for only 1,618 acres, whereas we have some 2,991 acres, the largest in area and *naturally*, the most beautiful of any in the country.

It is stated that the property on the southeast corner of Nineteenth and Market streets in this city, has been purchased by a market company, and it is proposed to erect a large and commodious market upon it. We believe this will make four market-houses on this great street, literally endorsing its name.

OTIS BROTHERS & Co., 309 Broadway, N. Y.—This firm has put up over fifteen hundred of their excellent passenger elevator, entitled *Otis' Safety Hoisting Machine*, for elevating guests to the various floors at lofty hotels, where the ascent by stairs would be laborious indeed. It is perfectly secure against accident, and is equally adapted to steam, water, animal, or hand-power. The chief hotels in the country are supplied with these hoisting machines, and we can strongly recommend them to all Architects, Builders, and those engaged in store-house construction.

WIRE ROPE.—There have been few improvements in things immediately connected with domestic economy which have proved so eminently effective as that which substitutes wire for hemp in the manufacture of cord, especially for the hanging of window-sash, where the annoyance of wear and tear is completely overcome. **DEWITT & Co.,** 633 Market street, in this city, manufacture this admirable article in every desirable form for hanging windows, pictures, clothes-lines, etc., as well as in making the larger dimensions for heavy hoistings, guys, cables, etc. In our first volume we drew the attention of Architects and Builders to this most useful manufacture, and we have now only to add that it gains patronage as its merits become known.

NEWSPAPER ENLARGEMENT.—There is a peculiar pleasure in seeing a well deserved success in this world, and we own to that feeling most unfeignedly, on seeing the evidences which the *Trade Journal* of this city presents us with in the form of a handsome new dress and

generally improved appearance. The weekly publication in question is always filled with practical, critical, spirited and spicy observations, alike useful to the merchant, trader, and professional man. Its wide circulation and popularity are both guaranteed.

PATINA OF BRONZE.—The term "patina" is used to designate a beautiful greenish coating which forms naturally upon the surface of bronze, especially that of copper and tin, under the influence of the air and moisture; consisting in most cases of a carbonate of copper which adheres very closely, and not only imparts a beautiful appearance to the metal, but also protects it from further oxidation. The formation of this patina proceeds with varying degrees of rapidity in different localities. In some places, especially in large cities, where coal is burned in considerable quantity, it does not develop itself, the metal assuming the appearance, rather, of a dirty cast iron. The difference in this respect has received the attention of a scientific body in Prussia, under the direction of which, numerous experiments have been made; and it has been ascertained that the formation of a good patina was not dependent upon the composition of the bronze, although the time required for this development may have something to do with the percentage of the different ingredients. It was furthermore discovered that by occasionally washing articles of bronze, exposed to the atmosphere, applying oil, and afterwards rubbing off with a soft rag all of this that could be removed, in the course of a few years a patina of the finest quality is developed irrespective of the location; and in this way the desired result can be, and actually has been produced on objects that had long refused to put on this exterior.

AN EARTHQUAKE-PROOF CHURCH.—The people of California, since the earthquakes of 1869, have a great dread of recurring shocks, and, as an indication

of this wholesome fear and a desire to prevent loss of life, we have intelligence from San Francisco that the Roman Catholics are building an "earthquake-proof church." This edifice—St. Patrick's Church—is built on a plan to prevent loss of life in the event of the shaking down of the walls. The side walls above the basement are only thirty feet high. At this height a roof rises, which, with the main roof, is supported independently of the walls by two rows of pillars inside of them. Both roofs are firmly bound to the pillars, and the pillars are fastened together by iron cross-beams, secured with heavy iron bolts, forming a network of great strength. The theory of the plan of construction is, that should the pillars be shaken down the roof would be launched off outside the walls, instead of falling inside, thus giving a chance of escape from the ruins. In thus falling the roof would be carried aside a distance of eighty feet, the length of the pillars.

TEST FOR THE GOODNESS OF GLUE.—Mr. Alfred Bird, of Birmingham, England, communicates to the *Chemical News*, the following test for the goodness of glue, which he states he has found very valuable:

"Assuming that 'that' is the best glue which will take up most water—take fifty grains of the specimen, and dissolve it in three ounces of water in a water bath. When dissolved, set it by for twelve hours, to gelatinize; and then take an ounce chip box, place it on the surface of the gelatin and put 'shots' into the box, till it sink down to a 'mark' on the outside. It will be found that, the stronger the glue the more shots it will take to sink the box down so that the mark shall be level with the surface of the gelatin.

"In a trial with the finest glue I ever met with, fifty grains of glue dissolved and gelatinized, with three ounces of water, supported, to the mark on the

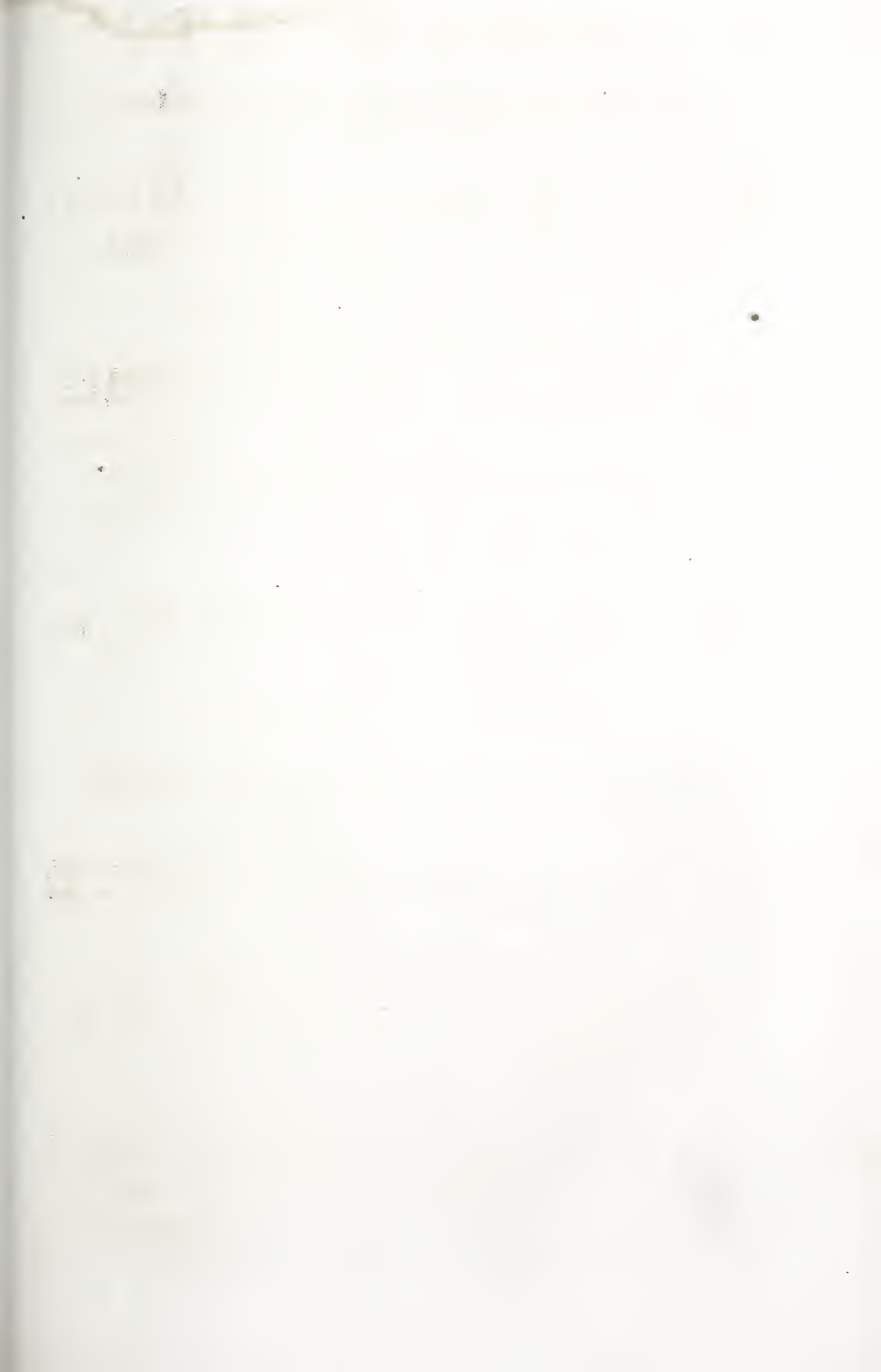
box, six ounces of shot, at a temperature of 58° Fah. On trying the same experiment with best Russian isinglass, fifty grains, dissolved in three ounces of water, supported nine ounces of shots, the temperature being the same."

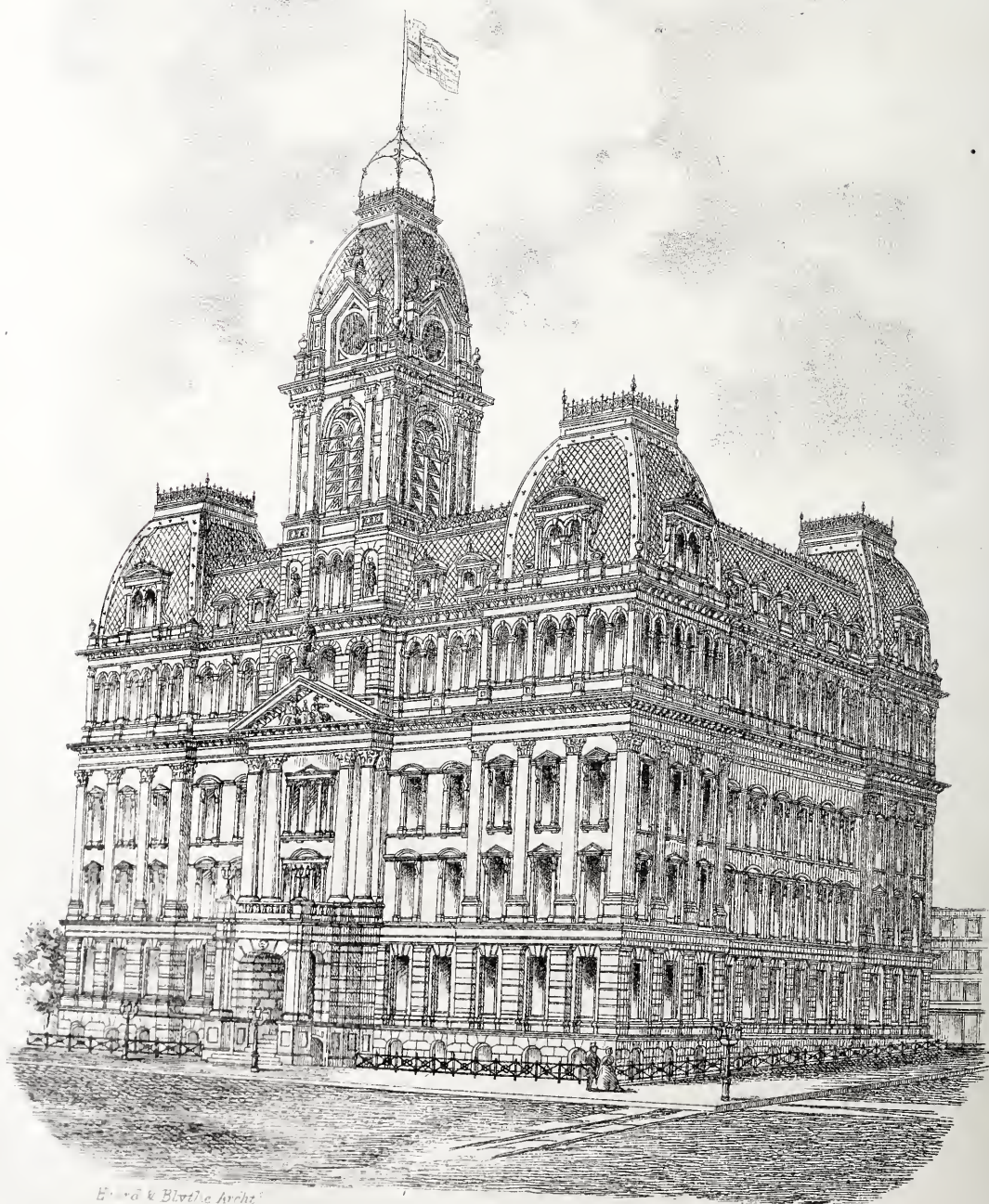
PNEUMATIC TRANSIT COMPANY.—The excavation which has been going on for some time, corner of Broadway and Warren street, is designed for the transmission of packages through cast iron tubes, with air compressed by machinery. This method has long been applied to the transportation of express freight in London with entire success.

Mr. Dixon, the superintendent, states that the work has been carried on from the beginning under the supervision of the Croton Aqueduct Commission; that it now extends to Murray street; that the Chief Engineer of the Croton Department has examined it, and reports the street perfectly safe from caving in or settling, and that in three or four weeks a completed line will be opened to the press and the public for experiment and inspection. It may be that the secrecy observed by this company in the work has been necessary to protect them from some of the branches of the "Tammany Ring," by which the city is governed. If they continue to comply with the law as closely as, according to Mr. Dixon, they have hitherto done, we can only accept what they will have to give us, be it something extraordinarily good, or nothing more than an experiment, and be thankful.

THE following notice was posted on a large box, which passed over our great through lines of railroad a few days since: "Baggage-smashers are requested to handle this box with care, as it contains nitro-glycerine, Greek fire, gun cotton, and two live gorillas!" The box was not broken.

A "Down-East" Yankee has recently invented a rat exterminator, consisting of a sort of powder snuff. The animal jerks his head off at the third sneeze.





NEW CITY HALL, CLEVELAND, OHIO

THE

ARCHITECTURAL REVIEW

AND

BUILDERS' JOURNAL.

LOOKING AHEAD.

THE paralysing effect which the outbreak of the late civil war had on the building energies of this nation, so prostrated effort that architects entered the army and gave all their energies to the requisitions of the critical moment. Materials of all descriptions went up to a fabulous price, and labor was universally enlisted in the ranks of the war.

Army contractors and speculators now improved the opportunity of making money; and as they acquired it no investment seemed to them more secure than that of building. Foreigners flowed in from Europe, in such numbers as to give artizans and laborers enough to meet the demand for their work, and building, with all the inflations of the period suddenly prospered to a wonderful extent. In fact, at the very time that the whole country was convulsed, and its very existence as a nation threatened, the building mania broke out in all its violence and displayed itself in our large eastern cities. Tourists and visitors, from other lands, beheld with wonder this, to them, inexplicable fact that in the very midst of a war, such as the world had never before beheld, our people coolly built palaces and surrounded themselves with greater

luxuries than ever they had before indulged in.

The civil war subsided, and peace came again with "healing on her wings." Taxation to pay for the past still held materials up to a high figure. Everything was dear, and how could labor be otherwise. The consequence was that building remained extravagant in cost, and yet it grew and increased notwithstanding; millionaires were now numerous and their desire to surpass each other in the magnificence of their residences, and places of business, gave Architecture such a patronage as to call forth the best efforts of our professionals, to meet the demands for the superb and unique.

The settling down of the South, and the rebuilding of her ruined cities, gave a chance for adopting the wide spread improvements of the day, and many architects sought her fields of resuscitated industry, and settled down to study the improvement of her future, in the advanced stage of design which marks the now prevailing taste.

Thus building progresses, and Architecture displays itself in many winning forms. Taste challenges the public eye; and the public eye, growing more and more critical from the force of observa-

tion, questions the object presented to its inspection, or if pleased, bestows the merited approbation.

The course of events has brought about a decline in the price of materials; and labor itself must be in keeping with the standard of family marketing, and the rate of house rent. From these prognostications it is easy to foretell that the demand for building this season must be great; and as our millionaires and well-to-do people are freely commissioning architects to raise up noticeable piles for their enjoyment, it is fair to presume that our cities and their suburbs will put forth fresh beauties of design, and rural homes become gems of architectic composition.

But, there is a still wider view to be taken of this season prospect, namely, the unlimited additions which have just been made to our country's available domain, through the agency of the giant-striding railroads which intersect the boundless tracts, and introduce the wandering millions to industrial employment and independence.

Villages and cities must of necessity arise all over the mighty territory in question, and the portable houses now being constructed in Chicago in such numbers, and transported to the hundreds of points along the Pacific railroad, will this very season be set upon their respective lots; these will make way for structures of portly stone, brick, and iron. Architecture must soon follow where construction leads; and that which is now but simply utilitarian, must assume the decorative dress of the older and more fashion loving cities. Commerce, as a matter of course, will spread her influence far and wide over the new born territory, and in her train our art will surely take the lead.

The necessary development of wealth ensures improvement and progress, and the new made wants of the far and farther West, must exercise an influence upon the many cities of the East.

Corresponding supply always follows

demand, and even now both Nature and Art seem to be equally alive to the wants of the hour. New quarries of marble and building-stone are being developed, and new inventions and improvements in everything at all connected with building, are seeking the light and making their utility evident every day.

Looking over the whole country, in its mighty length and breadth, we see abundant reason to congratulate our friends on the prospect before us, and the bright hope there is already on the horizon of our future.

It is a suggestive fact, in view of the great progress of this nation in the building line, that architects are increasing in numbers all over the country. Well, the sign is most acceptable, and we heartily bid them welcome, knowing that the demand for their services is the assurance of growing national wealth, and that there will not be more architects than there will be buildings to employ their skill upon. But, let us be understood as meaning really competent architects; for, anything short of thorough qualification in these days of advanced intelligence cannot succeed, although mere chance may present casual opportunities of practice to the most uneducated.

The ball is in motion, and it becomes the interest if not the duty of the profession to keep it going in the right track. Now is the time to decry any effort not founded on true principles of taste in design; and now is the time to put forth and make prominent the higher excellencies of our comprehensive art; so that the people generally may become intimate with chaste and elegant composition, allied to correct and substantial construction.

The building prospect for this season, we repeat, is cheering, whether we look to improvement in the North, reconstruction in the South; imported fancies in the East; or new-born progress in the interminable West. All around us is hopeful.

TRUTH IN MATERIAL.

THE ambitious desire which not a few of our citizens indulge in, of making appearances without the ability to secure the reality, is painfully observable in domestic construction, as well as in personal attire. The abundance of material now being manufactured to meet this imitative demand, is quite sufficient proof of the too wide existence of this unreality of construction.

It is true that the weaker materials do not always take the place of the stronger, even in this progress of imitation. As, for instance, stucco or other plastic material does not often represent stone in this country, as it so generally does in England. But iron occupies the place of both stone and brick very frequently in our country, a substitution which we do not so much object to, provided paint is not made to play the part of a deceiver, and cause the iron to seem what it is not.

As far as decorative design is concerned, the plea of economy may be fairly urged in favor of the use of iron as a material, through the agency of which, moldings, quirks, and the minutest foliage may be cast, which if executed in stone would cost enormously.

Terra Cotta is the next imitative material in the economic class; and although it is far inferior to the former in actual strength, it yet has, in an art-light, a higher claim to attention than iron can possess, for its composition is of the same nature as that of brick, and therefore there is an affinity which does not exist in the other case.

Iron is now sought to be used as a plating, like armor for the fronts of houses, and for this purpose it is cast with bevelled edges, and sunk or raised panneled, or even vermiculated, and in every manner, and by every device sought to be as imitative of *cut stone work*, as possible. These cast plates ar

to be hung on rows of hooks by means of eyes properly located for that purpose, and the whole superficial front is thus held out from the actual wall of brick, or rubble masonry, to endure until oxidation exercises its baneful influence in due time, and renders this pendent mockery too dangerous to human life, to be permitted longer to "hang upon the outer wall."

As yet, scientific skill is at fault in its efforts to render iron perfectly free from oxidation when exposed to the influence of the weather, and surely nothing looks more unpleasing than those stains of "iron rust" which seem to be the legitimate progeny of this metal, which cannot be repressed or kept out of sight.

Wood is the next material which is used, not alone for merely constructive purposes, but for deception also. Paint, here also is the insidious foe to truthfulness; and many a cornice of most attractive proportions and design, is indebted to painting and sanding for its "freestone" appearance. But, wood will sooner or later succumb to time, and rottenness and worms compel the usurper to vacate the lofty position it has too long held before the eyes of a misled public.

We will not pursue the subject farther; for we hope that all are agreed on the necessity for truth in material; and, no matter what amount of yearning ambition there may be in the minds of some of our citizens, let us hope that good sound sense of public opinion may deery all efforts to establish in Architecture a system of falsehood which may cause us to blush for our constructive misdeeds. Truth in material is as essentially necessary as truth in composition; for it is as much an offense against taste and judgment to make that appear to be stone which is wood or iron, as it is to place buttresses where there is nothing

to be upheld; or to rear up a seeming tower from a roof where there is no actual tower in existence, and no provision made for the support of such a structure.

In all things connected with Architecture, there should be an unquestionable meaning, and an indubitable truthfulness; otherwise there will and must be an antagonism, which cannot be subdued even by the influence of the chastest and most commendable design.

Mr. Ruskin, in his *Seven Lamps of Architecture*, when treating of the *Lamp of truth*, holds the following opinions:

"The violations of truth, which dishonor poetry and painting are thus for the most part confined to the treatment of their subjects. But in Architecture another and less subtle, more contemptible, violation of truth is possible; a direct falsity of assertion respecting the nature of material, or the quantity of labor. And this is, in the full sense of the word, wrong; it is as truly deserving of reprobation as any other moral delinquency; it is unworthy alike of architects and of nations; and it has been a sign, wherever it has widely and with toleration existed, of a singular debasement of the arts; that it is not a sign of worse than this, of a general want of severe probity, can be accounted for only by our knowledge of the strange separation which has for some centuries existed between the arts and all other subjects of human intellect, as matters of conscience. This withdrawal of conscientiousness from among the faculties concerned with art, while it has destroyed the arts themselves, has also rendered in a measure nugatory the evidence which otherwise they might have presented respecting the character of the respective nations among whom they have been cultivated; otherwise, it might appear more than strange that a nation so distinguished for its general uprightness and faith as the English, should admit in their Architecture more of pretence,

concealment, and deceit, than any other of this or of past time.

"They are admitted in thoughtlessness, but with fatal effect upon the art in which they are practised. If there were no other causes for the failures which of late have marked every great occasion for architectural exertion, those petty dishonesties would be enough to account for all. It is the first step and not the least, towards greatness to do away with these; the first, because so evidently and easily in our power. We may not be able to command good, or beautiful, or inventive Architecture; but we *can* command an honest Architecture; the meagreness of poverty may be pardoned, the sternness of utility respected; but what is there but scorn for the meanness of deception?

"Architectural Deceits are broadly to be considered under three heads:

"First. The suggestion of a mode of structure or support, other than the true one; as in pendants of late Gothic roofs.

"Second. The painting of surfaces to represent some other material than that of which they actually consist (as in the marbling of wood), or the deceptive representation of sculptured ornament upon them.

"Third. The use of cast or machine-made ornaments of any kind.

"Now, it may be broadly stated, that Architecture will be noble exactly in the degree in which all these false expedients are avoided."

Can anything be stronger than the reflections thus cast by the great English Art Critic and philosopher? Does the American reader doubt for an instant the applicableness of the lesson, all severe as it is, to our own case, as well as to that of our older and greater sinning brethren across the waters?

Truth in material should ever be the first great care of the conscientious Architect. Truth of design his object—truth in all things his interest and his policy.

BUILDING INSPECTORS.

WE have no desire to enter on any controversy as to the policy or impolicy of employing a certain officer under civic or state authority, to inspect and be accountable for the fit and proper construction of buildings, of all descriptions, in cities. But we do think that such an office if it must exist should be conducted with unquestionable fairness, and unswerving honesty. This office, being one ostensibly created for the protection and benefit of the public, is at least worthy of examination as to its merits or demerits.

Of those cities favored with the office in question we believe New York is the most prominent, and we fear the most complaining, at least we are led to suppose so from the language used towards it by a part of the press of that city.

Now, it must be evident to every one that a stringent building law is absolutely necessary in all large cities, for the protection of the public against carelessness, ignorance, or culpability on the part of those putting up houses; and to secure the citizens against any violation of its enactments, that a qualified officer, with assistants, shall be appointed to act as surveyor of all buildings and additions to buildings, constructed within the limits of such city in conformity with said building law.

We have reason to know that many of our professional brethren, have cause to complain of the petty obstructions thrown in their way by the working of these inspectorships, and that plans have had to be altered and amended (often injuriously), to suit the peculiar views taken by the Inspector or his subs.

There never yet was made a law so perfect as not to be the better of a mild construction; for, laws are not intended for punishment, but for protection against the necessity for punishment. Architects being made by law subservient to a building inspector (in

as much as they have to submit their plans and specifications to his judicial decision before they can legally commence to build), are thus actually punished by law, by being deprived of their right of private judgment as to the intent and meaning of the statute, a copy of which each of them possesses. As if the first and ever present object of every true Architect, was not to build securely for his own reputation (putting all conscientious feeling out of the question).

But, granting that these inspectors are of use in protecting the public against dishonest or dangerous construction, is it not obvious that they should be chosen from the most intelligent and truly practical men in the building community, and that they should be honest to the letter; and not alone that, but that they should be, like Caesar's wife, above suspicion. Certainly political bias should have no influence in the appointment of such public guardians if they are of any real use.

We do not undertake to say that a political feeling does or does not prompt the objections raised in certain quarters to officials of the class we speak of; but certain it is that weighty allegations have been put forth in New York against the re-appointments (under the recently adopted constitution) of the Inspector of Buildings in that city, which it would be well if that gentleman would challenge the investigation of, if it were only in deference to the public, whom his appointment was intended to serve.

Recent catastrophies too clearly show that criminal negligence exists some where. Would it not be judicious of the officer in question to clear his skirts of any doubt which might perchance have attached to his position?

The *New York Sun*, of April 13th, speaks as follows:

"We charged then, and our charges have never been even denied, that he has

connived for a long time at the grossest violations of the law providing for the safety of buildings in this city. We once more allege:

"That walls have been allowed to be erected of less thickness than the law requires, and that pay has been unlawfully taken for the permission.

"That some men have been compelled to put fire-escapes on their houses, while, for a consideration, other houses of a like character, and occupied by the same number of families, have been allowed to remain without any.

"That if certain men have been employed to do the work, any excuse for a fire-escape would be approved of.

"That for the last three years not *one* tenement house has been built in the city of New York in conformity with the law.

"That nearly every man building a tenement house within that time, has paid from one hundred to five hundred dollars a house for the privilege of violating the law.

"That within the past three years over 5,000 tenement houses have been built, and that for the unlawful privileges accorded the builders, over one million two hundred and fifty thousand dollars have been paid.

"And we cite, as an example, a case in which Andrew J. Kerwin was made to pay \$1,400 for permission to build thirteen tenement houses in Thirty-ninth street otherwise than as the law required.

"Since we first made these allegations, additional evidence of the incapacity, or something worse, of Mr. McGregor's management of his Department has been given by the dreadful catastrophe in Forty-sixth street on the 27th of last month, in which five human beings lost their lives by the falling of an improperly erected wall, and the more recent, though fortunately bloodless, occurrence of a similar nature in Lafayette place last Friday morning. In this latter case a wall seventy-five feet in length by six stories in height came down, carrying

with it a whole section of the building. The Superintendent of Buildings had been notified by an unprofessional observer that the wall was bulging, and sent his deputies to examine it. The deputies reported that all was right, and the work was permitted to go on. Within forty-eight hours the wall was a mass of ruins. Had it fallen during the daytime, fifty lives at least would have been lost. The nature of the accident was such that the Superintendent's men could not possibly have failed to see it to be inevitable, and they should have reported the necessity of taking down the wall immediately. Why they did not we do not undertake to say; but the fact that they did not, under the circumstances, suggests the worst suspicions."

ARCHITECTURE, A WOMAN'S STUDY.

WE have ever been of opinion that the refined taste inherent in woman's very nature, most especially fits her for the æsthetic requirements of architectic study, and we will confess to some surprise that while the gentle sex is in quest of mental occupation, the charms which surround this art of ours should fail to attract them to inquire into its claims to attention, as a something worthy their application.

With such an impression we awaited the, to our mind, certain development of woman's evident destiny, and were not a little pleased to meet in the *Woman's Journal* with the following:

"Why do not some of our bright girls who graduate from High, and Normal Schools, and who are looking for a vocation, study Architecture? It is a profession that pays well, after it is thoroughly learned, and one in which women of a certain kind of talent might excel. An Architect of this city who has skill, reputation, and very remunerative employment, informs us that he would be glad to receive a young woman, possessing the requisite qualifications, into his office, as a pupil—and that after

the first six months she would become self-supporting in her occupation. Is there no young girl who is attracted by this opportunity?"

There are many professional men who would no doubt give females an opportunity of making themselves proficient in drafting, and that they would answer their expectations, we feel that we can judge from what we have seen some accomplish. There is, in fact, no good reason why the delicate nicety of woman's hand, and the perceptive taste so peculiarly her own, should not be productive of admirable drawings and acceptable designs. In literature she has acquired a position which rivals that of man himself. In painting and in sculpture, she commands respect. In music she stands pre-eminent. In all the sciences which are said to complete a polite education, she is ever forward and not infrequently first. Then why should she not add Architecture, with all its lore of history, and its elegant accuracy of science, to her accomplishments? The day is already dawning which shall see woman greatly elevated above her too long existent inequality of mental position; and now that the other professions are gallantly opening ranks to receive her, it is not too soon for architects also to acknowledge her claims, and invite her to a trial of her ability in culting the choicest flowers of beauty to adorn the classic elegancies of design.

We do not propose, or even suppose that the gentler sex will ever assume the ruder and more masculine (so to speak) out-of-door operations, connected with the practical department of our profession—not at all; but, we do think that in the arrangement of plans, in Domestic Architecture for instance, that woman is the best judge of the convenience and economy of dwellings, for she it is who is the most interested party, and even in the external appearance of our homes who so anxious for the picturesque and the pleasing as she who presides there.

A literary woman is never so intently

particular in her work, as when with heartfelt affection she depicts the detailed beauties of the humblest cottage home. Does not this characteristic show that taste, the most natural and refined reigns in her bosom and sways her very imagination. What more is asked than the cultivation of this genuine art-love to make woman devoted to Architecture, with all its graces and attractions so winning, because so kindred to her mind?

By all means, then, let us offer her a liberal welcome, and we shall reap the grateful benefit in the expansion of that patronage we look for so ardently for our profession, and without which, with all its claims to the widest recognition, it will but live on slowly, patronized by the comparatively few, but scarcely recognized by the great majority.

ZINC ROOFING.—A great objection to the use of zinc as a covering for the roofs of houses, in spite of its cheapness and the ease with which the sheets can be applied, is found in the ready oxidation of the metal during wet weather, as well as in the unpleasant glare proceeding from it in sun-light. Both of these difficulties may, however, be obviated by the application of a certain substance, which gives to it a permanent slate color, and at the same time prevents decomposition. This is prepared by heating in a porcelain dish one part, by weight, of copper scales, with a mixture of three parts of hydrochloric acid, and one part of sulphuric acid, and continuing the operation until the red vapors cease to be evolved, and until the copper is dissolved. After this, sixty-four parts of water are to be added to the green solution, and the whole filtered.

THE sculptor Launitz, who made the Guttenberg monument at Frankfort, died recently at the age of 74.

NATIONAL CONSTRUCTION BUREAUS.

THE recent enquiry into the course pursued by the government Superintending Architect, relative to the New York and Boston post offices, goes far at least to prove that a necessity exists for a sweeping reform in this matter of Bureaus of Construction. In a country so enormous in dimensions, it is a very great absurdity to expect of an individual to superintend the national works to be built, and kept in repair throughout the land. He should have the comprehensive ability of a generalissimo, as well as a practical information so diffuse and universal, as to lead his mind intuitively, as it were, to correct conclusions without delay. Moreover, he must have an able staff of assistants to carry out his order and give his thoughts a tangible shape.

Supposing that a man, possessed of superhuman capacity for this ubiquitous office could be found, what salary would be an adequate remuneration for his herculean labor of mind and body? And if a proportionate salary, could not be allowed him by Congress, where is he to look for the balance which he considers his due. Where, but to the *dou-ciers* and private largesses, ever awaiting the little considerate kindnesses so extensively in his power to bestow. These he looks upon as legitimate perquisites of office, whether coming from certain small sections of the people, or from the whole people, as represented at large in Congress.

We mean nothing personal in these observations, but simply to enter our protest against national constructive bureaus, as not alone useless in themselves, but a gross injustice to the architectural profession throughout the country. Wherever a post office, custom-house, or other national buildings are required, there will always be found now-a-days, architects well qualified to design such, so as to meet the wants of the

locality; and, supposing that in the immediate neighborhood there are no architects of ability adequate to the task, it is easy to obtain the necessary talent, without going farther than the nearest large city. The materials which any locality affords are well known to the local architects, and do not require a commission from Washington to report upon their merits; so that here is one expense saved the nation. Then the delay of judgment on competing plans, the back stair influence on congressmen, and the hundred and one little vexations which the sadly experienced public know so well under the style and title of "Red Tape." All these are the necessary consequences of government bureaus of all description, and no less of a constructive bureau.

If we might speculate for a moment on the possibility of the position of Superintending Architect, to such a bureau being accidentally filled by some inexperienced person, whose sole qualification was his political influence in some congressional district, what a labyrinth of mischief might be constructed through such means; what a drain upon the National Treasury; what disgrace to the entire nation on the score of taste, or rather the total want of it.

There are very few architects in this country, if indeed there is a single one, capable of dictating to the profession at large, much less of mutilating to any advantage the several designs of a competition, for the purpose of manufacturing a complete composition out of their special points.

It is time that those who feel an interest in the profession, should combine against this monopoly on the part of the Government, so very anti-national in its principle and bearing. Such a desirable movement would have an effect, if led by the American Institute of Architects,

and it is to be hoped that the opportunity now offered by the attack recently made by General Farnsworth in Congress, on the extravagancies incurred by such a bureau as we decry, will not be allowed to pass by unimproved. It is to the interest of the whole profession to have this system abolished, and it is to be hoped that the inquest we allude to, will have the effect of drawing public attention to the matter.

It is charged that the New York new Post Office would have cost, in the way things were going, some four or five millions of dollars. Contracts are now

made for the entire building, at three million of dollars. In Boston a clear saving of three hundred thousand dollars has been effected. So that a total saving to the country on these two public buildings of a million and a half of dollars, is the consequence of the Washington superintendence being overhauled. For the future these things will be given out to competition, and the successful proposal be bound by contract. There are but two steps more; and these are, to have a local superintendence as well as a fair competition, for the best design open to all architects choosing to compete.

FREE FLOATING BATHS.

IN a former number of the REVIEW, we threw out some suggestions on the necessity for suitable bathing places, free to the public, where the sanitary exercise of swimming, etc., might be enjoyed, without being a source of annoyance to others. Some of our friends of the city daily press, objected to the introduction of such institutions, on the ground of expensiveness; the city, they said, "being already over-taxed." Well, we grant that Philadelphians have their own share of civic burdens, and perhaps a little more than is quite agreeable; but, is there any tax that would be so profitable in the end as that which would so conduce to the health of the community, as would the giving to the people the facility of free bathing? We think not. Nor is this an untried problem; it has been solved years ago in Europe, and it is too late in this advanced age to object to it as an expensive boon to the poor.

Water is, or should be, free to all; for, there is no greater deprivation, next to air itself, than the want of it. It is poured through our valleys. It is sent us from Heaven; its music resounds along our sea-shores. It is everywhere the profuse gift of the Omniscent Being,

intended not alone to fertilize the land, but to give life, energy, and moral strength to him who is made in His own likeness.

We are pleased to learn that the city authorities have resolved to take this matter in hand, and give the people an opportunity of enjoying free bathing, excluded from public view. This is no more than simple justice, seeing that an ordinance strictly prohibits bathing in rivers as a nuisance.

The plan proposed to the city authorities is a very simple and economical one, yet quite efficient for the purpose. It is a platform or raft one hundred feet long by forty-five feet wide, open in the middle, and having a gangway five feet wide all around. It is completely enclosed, lighted by windows along the sides, five feet high. The roof is composed of latticed girders, placed fourteen feet apart, boarded over and covered with plastic slate. This floating bath is anchored off the bank of the rivers, and is designed to rise and fall with the tide. A gangway connects it with the shore. The bottom of this floating bath is an inclined plane, having a depth of water three feet at one end, and at the other nine feet.

WATER SUPPLY FOR LEBANON, PA.

WE have been favored by Mr. H. P. M. Birkinbine, Engineer, with a copy of his Report to the Town Council of Lebanon, on a water supply for that place. The subject is presented in detail in such an exhaustive and interesting form as to ensure the consideration of all concerned. Mr. B. winds up by commending the South Mountain Gravitation scheme, and indeed from the lucid view given of it we should be inclined to think the most desirable. He does not make this source of supply a permanent one, but only to serve until the population reaches between twenty-five and thirty thousand. After which time the "water from Beck and Swift creeks can be brought in, or one of the other projects may be used, supplementary to the South Mountain supply."

Speaking of the Water-works as an investment, Mr. Birkinbine says:

"The money invested in a water supply, if judiciously expended, is fully represented by the enhanced value of all the property reached by its influences. Yet the interest upon the bonds issued for the construction of such work, and the expense of maintaining and operating them must be met, and the ultimate liquidation of the loan provided for. The question of how this can be done, in the least burdensome, and most equitable manner, becomes one of importance. The same rate or mode of taxation has seldom been adopted by any two places; some have secured a large proportion of the amount by general taxation, made in the early history of the works, before their use by private parties becomes common. Others make the principal assessment upon those who directly use the water. Each place deciding this matter according to the prevailing judgment of right and expediency.

"The practice adopted by some cities, of charging the property in front of

which the distributing pipes are laid, a sufficient price to pay for the expense of purchasing and laying it, appears to be an equitable one.

"It taxes the property directly benefited; and reduces the first cost of the works materially, making their construction possible, where in some cases the undertaking would involve expenditures, which, if paid for out of loans might injuriously affect their value, and thus increase the cost of the works unnecessarily or prevent their construction.

"A very moderate charge for water to direct consumers is $1\frac{1}{2}$ cents per 100 gallons, or \$150 per million gallons.

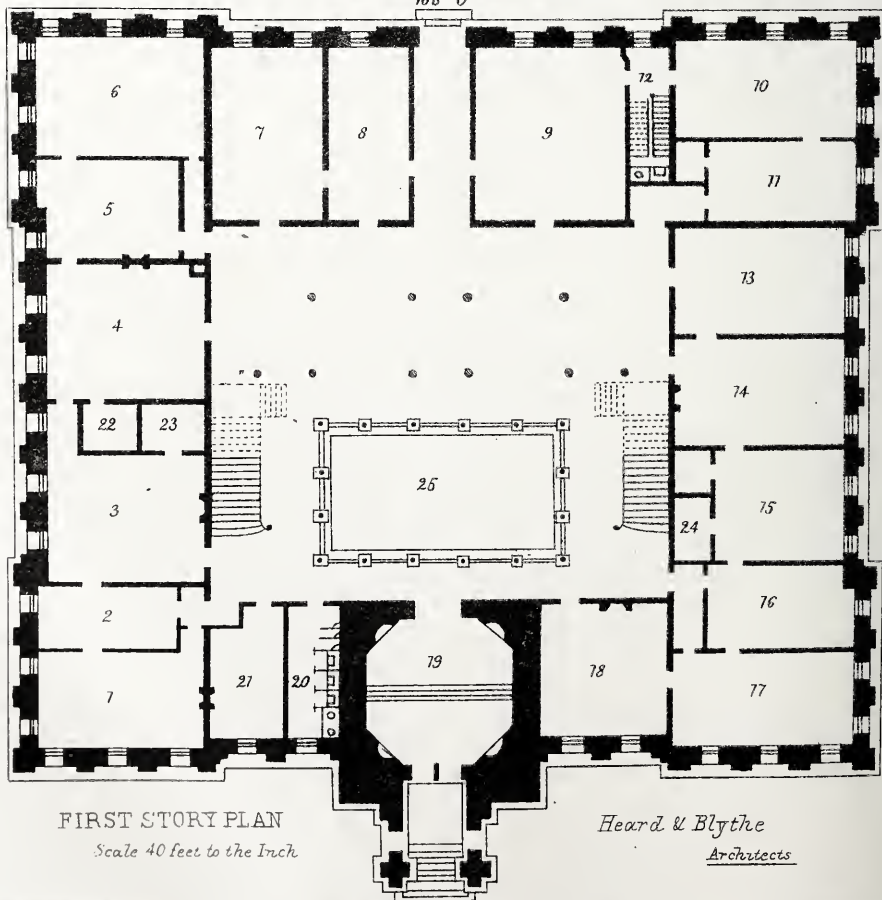
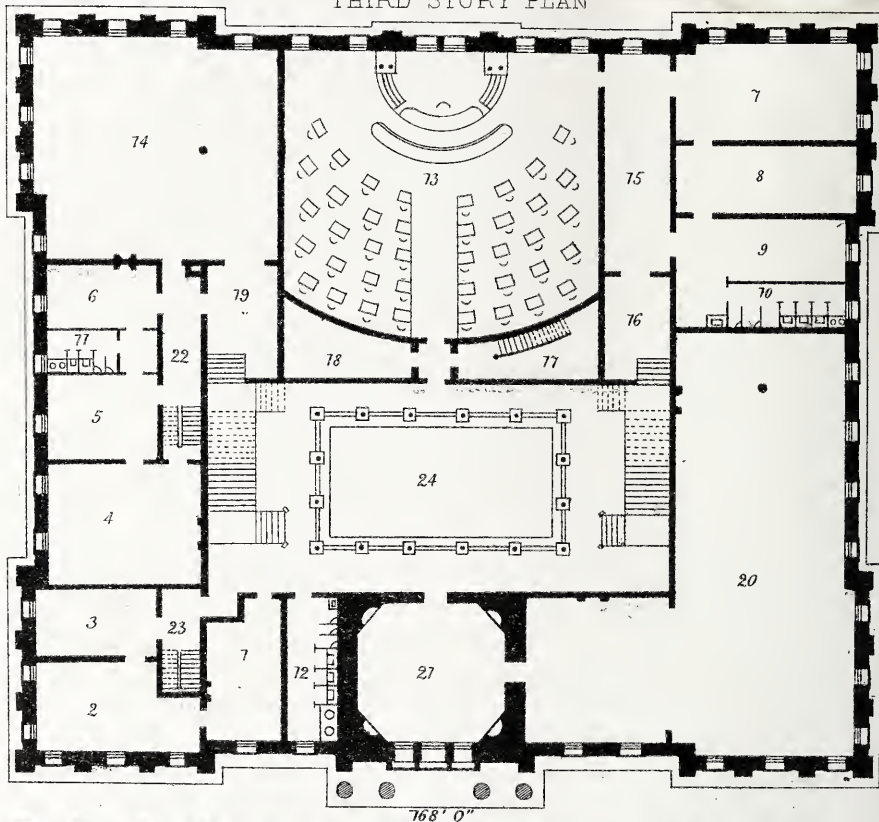
"When the average of 1,000,000 gallons per day is furnished; allowing one-third of it for municipal uses and losses of all kinds, the works will yield an income of \$36,500 per annum, an amount greater than the cost of furnishing 1,000,000 gallons by any of the plans proposed, and these rates are very low, some towns charging double this price.

"(Boston charges 3 cents per 100 gallons by measure for water supplied.)

"Maintaining the works will most probably be burdensome for the first year or two, but before five years they will no doubt become self-sustaining, and before twenty years' bonds mature, they will have paid for themselves entirely. At least this is the history of water works generally where care and prudence are exercised in their construction and management."

ZINC TANKS or zinc roofs invariably contaminate the water with which they come in contact, and make it entirely unfit for domestic purposes. The *Polytechnic Journal* recommends the use of asphalt varnish for coating zinc vessels made to hold water.

THIRD STORY PLAN



FIRST STORY PLAN

Scale 40 feet to the Inch

Heard & Blythe

Architects

NEW CITY HALL, CLEVELAND.

THE frontispiece in our present number, is the prize design of three that were accepted for the new City Hall, about to be erected in Cleveland. It is by Messrs. HEARD & BLYTHE, Architects, of that city, and represents a four story cut stone building.

The style as may be seen, is the modern French. There is an attractive clock-tower, and the corner towers making a *toute ensemble*, of a very pleasing character.

The whole building will be perfectly fire-proof, the floors resting on iron beams with brick arching. The heating will be by means of steam or hot water pipes in coils, on the latest and most improved principle.

The height of the structure, from the side walk to the eaves line of the fourth story, will be 94, and to the top of the clock tower 220 feet; and the outside measurement 166 by 147 feet. The long front is to be on Superior street, which will be similar in design to the east and west fronts. There will be three public entrances to the basement story; on the north, east and west sides respectively, and also a private entrance to the janitors residence. To the first floor there will be one public entrance—on the Superior street front—the steps being protected from the weather by a handsome stone porch. There will, besides, be an entrance from the south.

The bell section of the tower will be of cast iron, and the statuary upon the base of the dome of bronzed copper. The clock will be 162 feet from the ground, and the dials will be visible for a long distance.

The stairways inside are to be lighted from the roof by a dome light, 24 by 42 feet, of iron frame and ornamental glass. The open area is to be enclosed with iron columns, arches, spandrels and balusters. The cornice is to be perforated for inside

ventilation. All the doors opening into the corridors are to have fan lights above. Whenever practicable there will be open fire-places and grates to assist ventilation, such system being by far preferable to that of any other. The skylights have been brought as near the front of the building as possible, so as to give proper light to the vestibule and main entrance. There will be a skylight over each stair opening, in addition to the large skylight over the enclosed court.

The basement story is designed to be occupied by the Infirmary Directors, City Physician, Street Commissioners and Janitor, and there will be four spare rooms.

The first floor is intended for the offices of the Mayor, Auditor, Treasurer, Water Works Commissioners, Board of Improvements and Sewer Commissioners, which will be supplied with the necessary vaults and closets. The Mayor's rooms are located in the southwest corner, and communicate directly with the rooms of the Board of Improvements and Treasurer, and by a private stairway with City Attorney's rooms, and the Council and Aldermen's Chambers.

On the second floor there will be rooms for the Trustees of the House of Correction, Board of Health, Civil Engineer, City Clerk, City Attorney, Solicitor, Police Commissioners and Superintendent of Schools.

The third floor will be devoted to the Council and Aldermen's chambers, Committee rooms, Cloak rooms, Public Library and Chief Fire Engineer's office. Provision has been made for an Aldermen's chamber in anticipation of Cleveland at some time becoming a city of the first class. The floor of the Council Chamber will be raised, and the 48 desks arranged in tiers, each tier eight inches higher than the one in front, and it is so

planned that 56 desks can be placed on the floor. There will be a gallery for spectators, and a stairway from the lobby to the committee rooms. The Public Library room will be 32 by 164 feet, more than twice the size of the library room in Case Block, and high enough to admit of galleries for book cases.

On the fourth floor will be the Board of Education rooms and a public hall, with the necessary anterooms. This hall will be 64 by 122 feet, and will have an area of nearly 8,000 square feet, which is much larger than Case Hall. It will be 32 feet high, and lighted by windows on two sides.

The estimated cost of this building is \$352,000.

A reference to the accompanying plans of the first and third stories, will

show by the figures the arrangement of the various offices and rooms:

FIRST STORY PLAN.—1, 2 and 3, City Auditor. 4, 5 and 6, City Treasurer. 7 and 8, Sewer Commissioner. 9, 10 and 11, Mayor's offices. 12, Private stairway to Council Hall. 13 and 14, Board of Improvements. 15, 16, 17 and 18, Water-works. 19, Vestibule. 20, Water-closets. 21, Messenger. 22, 23 and 24, Vaults. 25, Light Well.

THIRD STORY PLAN.—1, 2 and 3, Fire Engineer. 4, 5, 7 and 8, Committee rooms. 6 and 9, Cloak rooms. 10, 11 and 12, Water-closets. 13, Council Hall, 55×60. 14, Aldermen's Hall, 45×50. 15, 16, 17, 22 and 23, Lobbies. 18, Closet. 19, Stairs to Gallery. 21 and 20, Public Library rooms, 32×82, 28×25, and 25×25. 24, Light Well.

A STORE FRONT IN PITTSBURG.

THIS was an old building remodeled; and as the floors were of insufficient height, it was found necessary to make the store equal to two stories, cutting away the intermediate floor in the centre, so as to turn it into a gallery around which an open balustrade was constructed, thus producing a light and cheerful effect without in the least reducing the strength of the building.

The front is constructed of iron up to the cornice of the store. The superstructure is of brick, with rusticated pilasters of the rustic stone. Iron bressummers sustain this superstructure. The roof is a Mansard, with an ornamental dormer in the centre, flanked with balustrading.

This store presents an attractive appearance, and is in every way well adapted to the business it is used for, namely, the sale of china, glass, and earthen ware. The display externally, by show windows, is all that is desired; and the extensive gallery already spoken of, gives to the interior an amount of space all within range of the eye from

below, which makes this re-construction very desirable for business purposes.

In the rear of the building, and running across the breadth, is the stairway leading to all the floors. So that this necessary part of the house does not interfere with, or reduce the width of the store and show-rooms.

The show windows and entrance are of French plate-glass, and the whole is fitted up in a manner suitable to the style of the design.

The entrance is kept back, so as to give additional side light and show windows, adding considerably to the amount of display.

The building treated of is an old one having been erected many years ago, and came into the hands of the father of the present senior proprietor in 1841. Since which time it has been used for the same business, and is probably as substantial a building to-day as any that might have been erected to replace it. There are many buildings pulled down and rebuilt, which similar treatment to this might have saved.



STORE FRONT-PITTSBURGH

HISTORY OF THE ARCH IN BUILDING.

THE first bridge was probably a tree which had fallen from one bank to the other of some mountain-torrent. The method of communication thus supplied by accident, men would soon learn to obtain for themselves, by the rude resources of art; and ere long the opposite banks of rivers would come to be connected by means of timbers, or flag-stones, supported upon piers. The application of this notion of a bridge, seems to have constituted the whole art of bridge-making up to a comparatively recent period in the history of mankind. It is, however, altogether inadequate to the passage of deep or rapid currents, and fatal to navigation; and we accordingly find that the Egyptians, although they swarmed along both banks of the Nile, never built for themselves a permanent bridge across that river. The Tigris, too, and the Euphrates, on whose banks dwelt that other enterprising and highly-polished nation of remote antiquity, the Chaldees, were bridgeless. And even in the age of Pericles, there was no stone bridge over the river Cephissus, at Athens.

Necessity is said to be the mother of invention: there are certain matters in which she has been exceedingly slow in coming to the birth, and of this the discovery of the arch is a memorable example.

The Egyptians are said to be the first nation who used the arch in their buildings,—arches of stone and brick have been discovered at Thebes and Nimroud. The form of the arch is supposed to have been known to the Greeks, although the ruins of their temples present no evidence of its construction. Of Europeans, the first who appear to have made the discovery were the Etruscans; and the earliest existing specimen of the arch in Europe, is said to be found among the

ruins of the Etruscan town of Volaterra.

To the Chinese, the secret of the arch appears to have been known from time immemorial. In fact, it is difficult to fix upon any useful contrivance which is not at present, in some degree, known to that singular people; or any period of history when they did not know it. They certainly used the arch long before it was thought of in Europe. It covers the gateways in their great wall; they availed themselves of it in the construction of monuments to their illustrious dead, and in the formation of their bridges.

From the Etruscans, the secret of the arch passed to the Romans, and was soon employed in the construction of bridges over the Tiber. Of these several remain; they are, however, but awkward specimens of the art of bridge-making. Their narrow arches are supported upon huge unsightly piers, which form a serious obstruction to the current; and they thus involve a principle of weakness in their very strength.

The Romans have, nevertheless, left us, in other parts of their dominions, bridges of extraordinary strength and great beauty. Of these, that of Alcantara is perhaps the most remarkable: its road-way is 140 feet above the level of the stream which it crosses, and its arches 100 feet in span. It was built by Trajan, under whose reign was also erected a bridge over the Danube, of which many incredible things are told by Dion Cassius; and of which nothing is to be seen but now and then the foundation of a pier. He built it that he might conquer the Dacians; his successor destroyed it, that he might restrain their incursions into the empire.

In those troublesome times which succeeded the fall of the Roman empire, no

bridges were built. Rivers were, for the most part, passed by fords or ferries; these frequently became subjects of contention between neighboring barons, or were taken possession of by outlaws; and travellers, in availing themselves of an insecure method of transfer, were subjected to the certainty of being heavily taxed, and the chance of being plundered.

It was about the commencement of the twelfth century, that one Benezet, a cowherd, appeared in the Cathedral of Avignon, and announced to the multitude a special mission from heaven for the erection of a bridge over the Rhone at that city.

By efforts little less than miraculous, this singular enthusiast contrived, in the course of a few years, to erect a bridge which, whether we consider it in reference to its enormous dimensions or the local difficulties to be overcome in its construction, claims to be ranked among the most remarkable monuments that have ever been erected by the skill and ingenuity of man. Unfortunately, a flood of the Rhone carried it away. The labors of Benezet did not, however, altogether disappear with his bridge; he obtained a place among the saints of the Roman Calendar, and became the founder of a religious order, called the Brethren of the Bridge, by whom some of the finest bridges in Europe have been erected. Of these, that of Saint Esprit, on the Rhine, is not far short of a mile in length; and that called La Vieille Brioude, over the Allier, is a single semi-circular arch of 180 feet in span, and until the erection of the Chester Bridge—which is 200 feet in span—the largest arch. Of the same date was the old London Bridge, the work of Peter of Colechurch; it would, however, greatly suffer by comparison with the labors of the Brethren of the Bridge. From this period up to the present, the art of bridge-making has continually progressed, and most of our rivers are now spanned by arches with which the labors

of former ages will bear no comparison, either as it respects the boldness and grandeur of their design, or the perfection of their detail.

In modern times, the wooden bridges of Germany and France are remarkable for their scientific combination in arrangement, but our own land justly claims the precedence for simplicity, mechanical perfection, and boldness of design. The most remarkable bridges in the world are the Britannia and the Victoria tubular bridges, the latter over the St. Lawrence; the Freyburg (Switzerland) and Niagara suspension bridges; and the Keokuk and Hamilton wrought-iron bridges over the Mississippi, almost completed, being the widest and finest of the kind in the world!—*Educational Gazette.*

LAYING CORNER-STONE, HARLEM.—The corner-stone of the fine new edifice in course of erection for the One Hundred and Twenty-fifth street M. E. Church, Harlem, has been laid. The church is situated on the corner of Madison avenue and One Hundred and Twenty-sixth street, fronting upon the former. In style of Architecture it will be after the Gothic of the thirteenth century. It will have a front of 78 feet upon Madison avenue, and extend 136 feet upon One Hundred and Twenty-sixth street, with a front for the chapel upon this street. The church will contain one hundred and sixty-two pews. The chapel will be arranged with every convenience for Sunday-school and Church purposes. The building is to be constructed of brown-stone. The site costs \$25,000, and the contracts which have been made for the completion of the edifice amount to \$55,000. To meet this a subscription has already been made of over \$20,000, and the old edifice and site are estimated as worth \$25,000. The ladies of the Society have undertaken to furnish the new house of worship, and their first effort realized \$2,600.

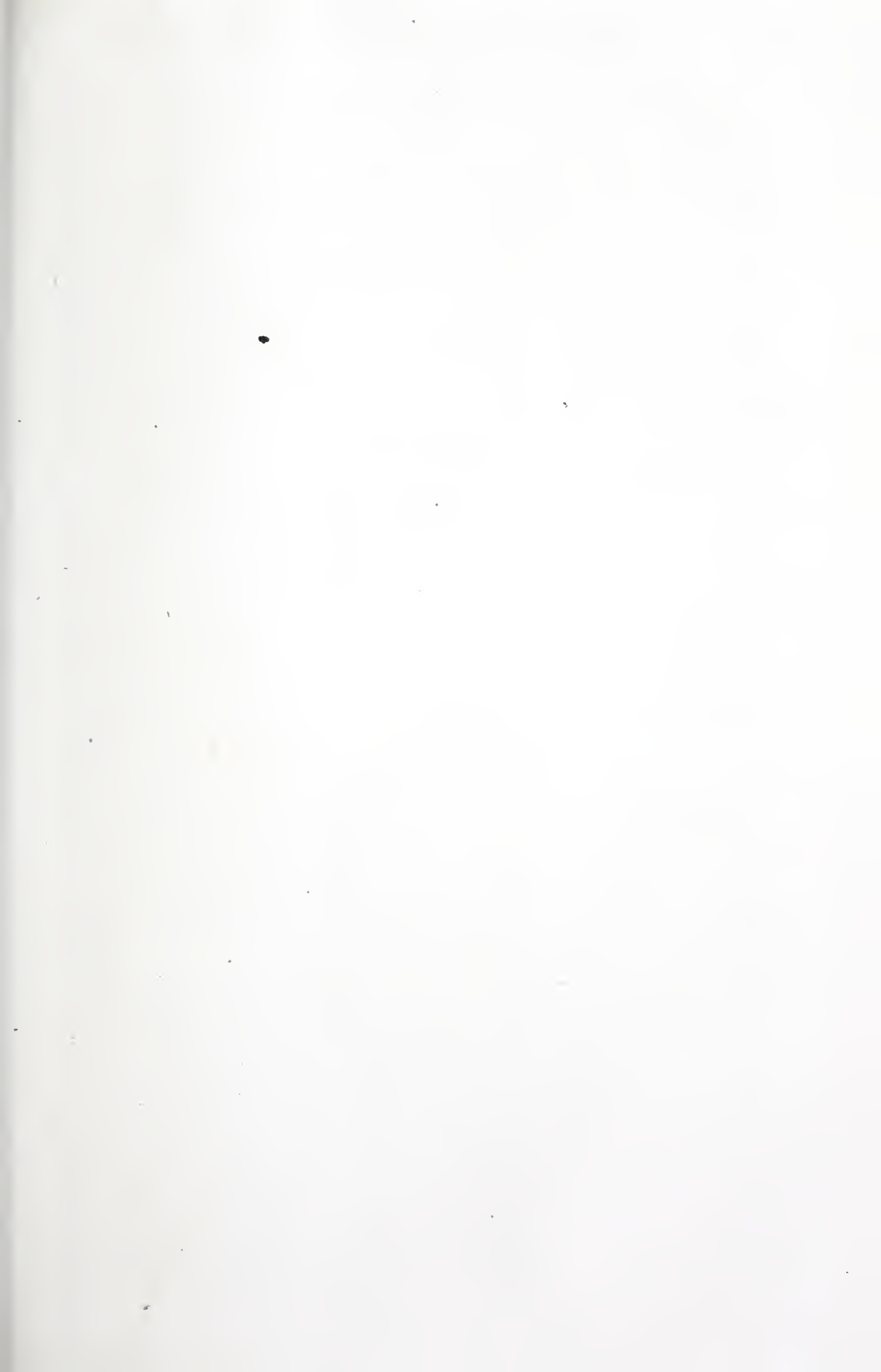


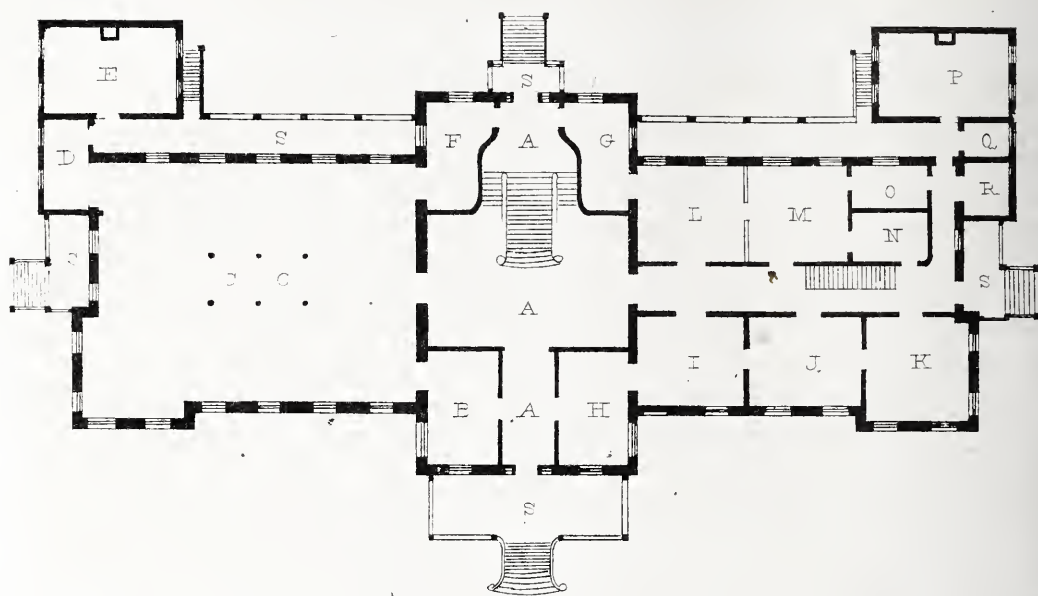
ORPHAN ASYLUM-AUGUSTA, GEORGIA.

J. S. K. 1851

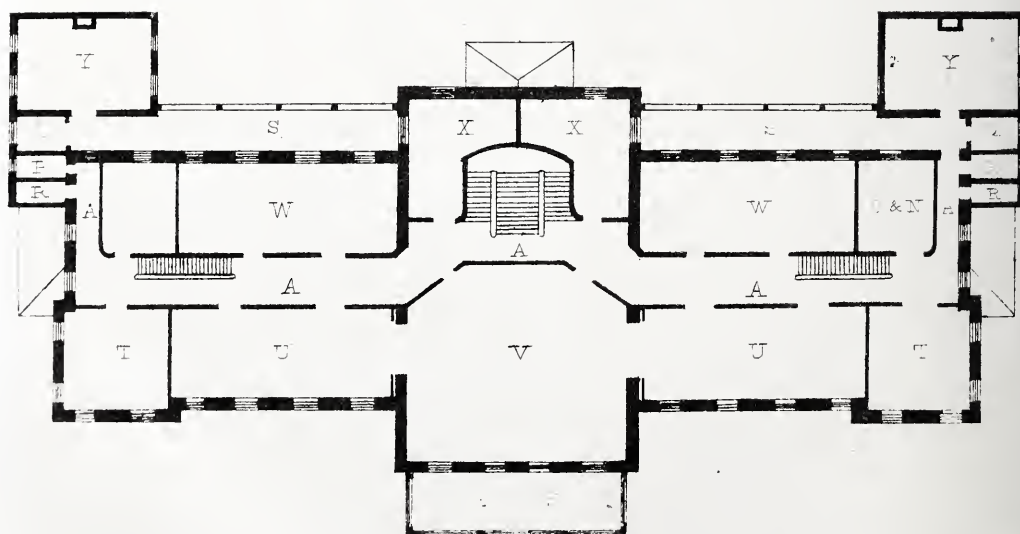
J. S. K. 1851







FIRST STORY



SECOND STORY.

ORPHAN ASYLUM, AUGUSTA, GEORGIA.

THIS design was prepared for the Augusta Orphan Asylum, by D. B. Woodruff, Architect, and to be built under his superintendence in the city of Augusta Georgia. The building presents a front of one hundred and eighty-five feet, by a depth of ninety feet, and is three stories high, covered with a Mansard roof. The centre or main building of the plan is longitudinally divided by a hall ten feet in width, and transversely by a hall twenty-four feet wide. This contains the main stairway which is very spacious and directly opposite the main entrance. On the sides of main entrance are the office and public reception rooms. The left wing principal story has a spacious dining-room; kitchen, and pantries adjoining, having light and air on three sides. The right wing will form the residence of the superintendent and family, with an extreme wing on the rear, in which is a complete laundry. The upper stories of centre building, is divided into a large nursery for each of the sexes, dormitories and a chapel which is finished through two stories, having a gallery on three sides, and a ceiling twenty-eight feet in the clear.

The upper stories of the wings are divided into school-rooms, teachers'-rooms, and dormitories, and adjoining the latter, are bath, wash and clothes rooms.

In the extreme wings on each floor are the infirmaries, being spacious, airy, and remote from the centre of the building. On the rear and connecting the extreme wings with the centre building, are wide verandas on each story adjoining the school-rooms and dormitories, which will give the children a fine place for resort, and also afford a fine protection against the extreme heat of the sun; this being the south front. The kitchen and laundry will be fitted up in the most approved

manner. The building is to be heated by steam, and every precaution taken for good ventilation, both by natural and artificial means. The building is to be put up with pressed brick, and stone trimmings, and with its artistic projections and outlines, will present a fine appearance. The front of the centre building has a two story portico of rich and elegant details; while springing from the roof above, is an unique and graceful tower, having upon each of its sides a handsome rose window, to be used as a clock face, having an elevation of eighty-five feet from the ground.

The following is a description of the plan. A, A, A, A, Halls. B, Reception-parlor. C, Dining-room. D, Pantry. E, Kitchen. F, Matrons'-room. G, Stewards'-room. H, Office. I, Library. J, Sitting-room. K, Private Parlor. L, Bed-room. M, Bed-room. N, Clothes-room. O, Bath-room. P, Laundry. Q, Elevator. R, Water-closet. S, Verandas. SS, Porticos. T, Teachers'-room. U, School-rooms. V, Chapel. W, Dormitories. X, Nurseries. Y, Infirmaries.

SEVASTAPOL.—A great deal was heard of this fortified city some fifteen years ago, when the British and French battered it with their artillery for nearly two years, and finally took and destroyed it. But it is now said the walls have been completely restored, and upwards of three hundred houses have been built in the place of those which had been ruined by the bombardment. A new church in the form of a pyramid, built entirely of marble, has also been erected in the church yard of the town. The funds for the construction of this building were raised by a public subscription in the whole of Russia.

LESSONS FOR LEARNERS.

INTERCOLUMNIATION—TUSCAN AND DORIC.

THE spacing of columns is greatly dependent on the fact of their being attached to the wall of a building, or their being insulated; for, in the former case, the real or imaginary weight to be borne is not so great, owing to the wall itself assisting in its support. In the event of the columns being insulated the case is entirely different; and it is obvious that the interspace must necessarily be less. When columns are attached, or make a part of the wall, they are said to be "engaged columns;" such are not limited in the intercolumniation except by the openings for doors and windows.

The Greeks gave distinctive names to the various intercolumniations, which it would be well if the learner would commit to memory, as they have been universally accepted, and are the same now in use. They are as follows:

Pycnostylos, when the columns are once and a half of their diameter distance from each other.

Systylos, when their distance from each other is two diameters.

Eustylos, when their distance from each other is two diameters and a quarter.

Diastylos, when their distance from each other is three diameters and a quarter.

Aræostylos, when their distance from each other is four diameters.

In the Tuscan the intercolumniation is governed by the material used; which, when wood, permits of a wider space than when brick or stone is used.

Vignola, whose authority we adopt, has made the *Eustylos* two diameters and a third (instead of a quarter), in the Tuscan, as well as in the Ionic and Corinthian, but not in the Doric.

The Ancients had several modes of spacing their columns, which the careful

and always interesting Vitruvius gives a detail of in his third and fourth books.

In the Doric the intercolumniation is regulated by the triglyphs, of which one was always to be placed directly over the middle of each column, so that they were either *systyle monotriglyph*, equal to one and a half diameter; *diastyle*, or *aræostyle*; the Tuscan intervals were exceedingly wide (for the reason before given that the bearings were of wood), some of them being above seven diameters.

Palladio used the *aræostyle* in the Tuscan and the *systyle* in the intercolumniation of the Corinthian order; by which practice the Corinthian peristyle, the character of which should be extremely delicate and light, becomes twice as strong a material as the Tuscan, of which the distinguishing characteristics ought to be extreme solidity.

The examples given in the accompanying engravings are of three-quarter, not insulated columns; and the intercolumniation is therefore amenable to the opening, as much as to the rule which governs insulated columniation.

Again, the columns are raised upon pedestals, which fact admits of the reduction of the diameter of the shaft, at the same time that the proportions of the column are maintained, and the cornice, frieze, and blocking, at the same time not unduly enlarged. In fact there are few positions in which the pedestal comes in more appropriately than in this very practice of intercolumniation.

Vignola makes his shaft in the Tuscan diminish only from one third of its height, a mode of treatment which is open to objection by some as destructive of grace. In the Doric he does not adopt the same treatment, and the contrast between the two modes is very striking. Many of the old masters so treated, not

one, but all the orders, and some went even farther, and caused the shaft to swell to a greater diameter until it reached one-fourth, one-third, or even one-half of its height. In fact, the most whimsical efforts at novelty have been displayed in the outline of the shafts of the orders. Raphael even went so far as to twist them as seen in the baldachino which encloses the high altar in St. Peter's at Rome; but the effect is anything but pleasing. Sir William Chambers, in his *Civil Architecture*, justly criticises all these modes as deviations from the true line of taste; and it is not a little surprising that so elegant a mind as that of Vignola, should have been led to see any improvement in such treatment of the shaft of the column of this order.

The Doric order, it will be perceived on examining the engraving, is governed in its intercolumniation, by the placing or centering of the triglyphs; the equal division of one coming directly over the centre line of the column; and in like manner the dividing line of the triglyph coming directly over the centre of the key-stone of each arch. The fluting of the shafts of the columns is without fillets, and the necking plain.

The measurements and proportions are so accurately detailed and figured, that the learner can have but little trouble in working them out to a fuller scale on a sheet of drawing paper. And this is a practice we would most particularly urge on our beginners; for there is nothing gives so perfect an idea of the composition of an order, as drawing its outline, and filling in its details to as large a scale as convenient, and perfectly in conformity with the mode of practice of some leading Architect, whose name, as that of Vignola, is an authority.

We would also recommend our learners to work out the principle of intercolumniation, in every possible phase in which it may present itself; especially in the case of insulated col-

umns at various distances of projection from a building.

A strict attention to this subject is the more to be urged, when we consider the wonderful influence intercolumniation has upon the positive beauty or deficiency of a columniated façade; for, it must be very evident to every mind, even in the ideal view of the question, that a greater or a less interspace must be productive of a heaviness or a lightness of effect, highly detrimental to the most desirable interests of a design. It is for this reason that the old and well-tried masters of our art have studied intercolumniation so very carefully, and yet there are discrepancies to be found in the works of most of them which give pain to the observer, and cause him to doubt the actual genius of men whose designs in other respects have justly won his admiration.

There is one proportion in particular which cannot be too strictly attended to as having direct reference to intercolumniation, and that is the relative dimensions of the cornice, frieze, and blocking course; for here indeed a failure is most lamentable, either that the apparent weight to be carried by the columns (if insulated), should be too much for them, or that they should be too robust for the lightness of the burden placed upon them.

The coupling of columns in intercolumniation is done in two ways: namely, at either end of the portico, or throughout. The former practice is adopted when the whole space is nearly, but not quite sufficient, and the coupling at each end is a substitute for the otherwise necessary expedient of adding an interspace, and thus crowding the columns and making an unpleasant effect in the intercolumniation.

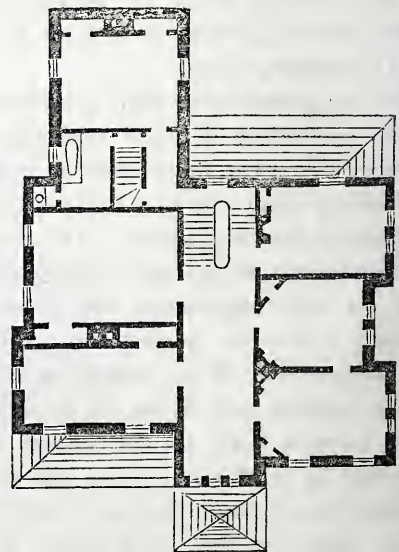
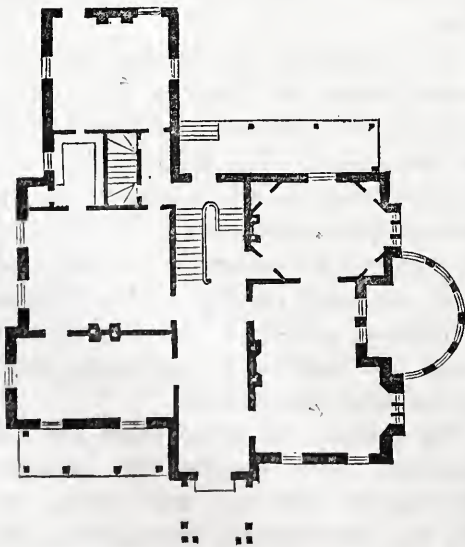
De Lorme, and some other old authorities, have coupled the columns throughout with very fine effect. In the fine façade of the colonnade of the Louvre at Paris there is an example, although not projected from the building.



A VILLA RESIDENCE.

THE design here presented is well adapted for a large family possessed of ample means. It is intended to occupy a site on gently rolling ground, which when tastefully planted, with appropriate shrubbery, cannot fail of adding materially to the appearance of the house, and of giving it that air of comfort without which the most elabo-

designed. A little attention to the arrangement of the plan, as shown in the accompanying diagrams, will give an idea of the chief points in its composition.



There is a *porte cochere* in front of entrance, from which a wide hall runs to the rear, at the end of which is a staircase, under the return of which is a passage with a door leading out on the rear veranda and yard; also a door into another pas-

rate effort at domestic Architecture fails to meet the end for which it ought to be

sage having doors respectively to the Dining-room and Kitchen, as well as an enclosed private stairs, back of which, and connected alike with the Kitchen and Dining-room, is a capacious pantry with a plate-safe built in.

In front of the Dining-room, and immediately off of the hall, on the left hand side, is a Parlor with veranda in front.

On the right hand side of the hall, entered by two doors, is the Drawing-room, which opens into the Library. On the side of the Drawing-room is a balustraded terrace, the entrance to which is through French windows, or sash-doors.

In the second diagram is seen the arrangement of the sleeping chambers.

The hall is over that on the first floor; and each apartment is over one below; except that over the Drawing-room, which is divided so as to make two chambers. Over the Pantry is the Bathroom; and over the plate-safe is the Water-closet.

The chambers are well provided with clothes-closets, and the three principal ones have fire places, while the family sleeping rooms have flues for stoves.

The lighting and ventilation of this design are in all respects perfect; rendering such a house healthful and comfortable.

There is an attic floor from which the observatory is reached. The private stairs continue up to this floor.

THE STEVENS' INSTITUTE.

IT will be remembered that the late Edwin A. Stevens, of Hoboken, among other public bequests, left a munificent sum for the founding of an institute of Technology; of which Professor Henry Morton in a recent address, at a meeting in Hoboken, said:

It has been judged advisable by the Trustees of the Stevens' Institute of Technology, that, on the present occasion, some statement should be made as to the plan which they have elaborated for their new institution, and the grounds on which their decisions have been founded.

As the representative of the future executive body of that institution, I therefore propose to state this evening, with your permission, what it is designed to do in carrying out the instructions left by the founder of this benefaction, and some at least of the facts and arguments, of which these plans are the result.

In the first place then, it is to be observed, that Mr. Stevens in his will devotes certain funds to the erection and maintenance of an "institution of learn-

ing" without further limitation of its scope and character, thus making it the duty of his executors to give such precise shape, and such detail of arrangement in the application of his bequest, as would seem to them in view of all the circumstances, most wise and beneficial.

In the performance of this duty, a thorough study has been made of the whole question, not only in its local, but also in its general relations; not only with reference to the interests of this place and its inhabitants, but also with reference to other "institutions of learning" and the wants of our country at large; not only as regards the needs of the present time, but also with reference to the developing exigencies of the future.

I think that, by following out in regular sequence the ideas which have been reviewed and developed in this process, and thus bringing you step by step to the final result and conclusion so reached, I shall succeed in giving you the clearest and most true idea as to what it is proposed to make the Stevens' Institute of Technology, and why such

will be the best form into which it could be molded.

To appreciate, accurately, the essential conditions of "an institution of learning" to be established at this time, we should briefly review the past history of such establishments, that we may see what has been their direction of growth, and thus know how a new one should be constituted so as to be not only equal to the demands of the present, but also prepared to fulfill in due course the requirements of the future. * * * *

Seeing then that the past history and progress of educational institutions would point us to the path of scientific and practical pursuits, we may well inquire in the next place what the special needs of our time and country call for in those institutions of learning, in which the present and future generations are to obtain that knowledge by which the prosperity and dignity of our nation are to be maintained and augmented.

Not long ago much interest was excited in England by a letter from Dr. Playfair, published in the *Times*, which represented the evidence of improvement and progress furnished by articles placed in the Paris Exhibition as much less marked in the English department than in the collections of some other nations, and traced this difference to the superior facilities afforded in the latter countries for general scientific and technical education.

The School Inquiry Commission have officially addressed interrogatories on the subject to the other English jurors, and the various answers received are wonderfully concordant, both as to the fact of a great difference in progress on the part of different nations, and also as to the relation of this difference to the educational facilities existing in various cases. Thus, Dr. Tyndall, well known to all by reputation, says: "I have long entertained the opinion that, in virtue of the better education provided by continental nations, England must one day, and that no distant one, find herself

outstripped by those nations, both in the arts of peace and war. As sure as knowledge is power, this must be the result." Professor Franklin remarks: "I quite agree with Dr. Playfair in referring this want of progress in the manufacturers of this country chiefly to the almost utter lack of a good preparatory education for those destined to take part in industrial pursuits." Omitting the remarks of many others, which are to the same effect, we finally quote from Mr. Scott Russell, who after a very full discussion of the subject in detail, says: "Prussia, Switzerland, Belgium, France and America seem to make progress in proportion to the excellence of their educational training."

There seems, in fact, to be overwhelming testimony from the best authorities in proof of what is in itself eminently probable, namely—that they who know the most will learn the most in addition; and that the most valuable discoveries and inventions will be reached by those who, having a sound knowledge of general principles and of previous labors, can devote their whole force to the development of the new and the possible, and waste no energy on the redevelopment of what has been already exhausted, or the devising of combinations utterly ineffective because ignoring the actual properties of matter and the essential laws of force. That we, as well as the manufacturers of England, should take the lesson to heart and act energetically upon its teaching, is evident to the most casual observer. An hour's study of the Patent Reports, or of any publication announcing indiscriminately all improvements, so-called, and new (?) inventions, will show us that four-fifths of those devices would have been abandoned, or improved (in either case with great advantage to the deviser and the public) had their inventors possessed a good general knowledge of physical science.

Nor are these errors confined to the uneducated or illiterate. My own experience has repeatedly furnished me with

striking examples of similar and, as regards their results, more lamentable deficiency on the part of those whose proficiency as "scholars," in the old sense, was unquestionable. * * * *

Far be it from me to disparage the real advantages of what is termed a classical education.

I have had the good fortune practically to test its merits, and not I trust altogether unworthily to have run in that time honored course, and fully recognize the effects and value of the mental training which it affords. For certain minds, this is of especial and unparalleled value. There are many to whom the study of language, for example, has a charm which no other subject possesses. Others, again, find in the pure mathematics a soul-satisfying harmony and a symmetrical beauty of proportions which the pencil of a Zeuxis or the chisel of a Praxiteles would fail to portray. We would not for a moment damp the ardor or restrain the eagerness of these. Let every advantage be afforded them in the development of their powers by these exercises, which for them are undoubtedly of unequalled efficiency. Such facilities are in fact already supplied in superabundance and there are classical colleges all over the Union languishing for students. Yet, while a training is best for one class, we feel quite sure—that the same amount of time and effort devoted by others to physical studies, will show itself to be as useful a mental discipline to them. Surely the laws of grammatical construction cannot exercise the mind more beneficially than those of chemical combination, or the analysis of a sentence be more improving than that of a substance; nor yet can it be possible that the study of the works of pagan men should be more elevating to the mind than that of the works of God.

What we maintain is simply the equality in value, as a mental discipline, of all studies of a rational character, thoroughly and diligently pursued; and it is for this reason that we think you

will be sure to commend the judgment of the trustees in making the Stevens' Institute a scientific school in a special department, which is much in need of such an institution. By this means will not only the general cause of education be advanced, but a special necessity of our time and country will be supplied, a fresh impetus will be given to our national prosperity and this place acquire a new distinction, and peculiar source of interest throughout our land.

In addition to these general statements it may be of interest to many here present to know something more as to the details of the proposed course, and the provisions of Mr. Stevens' bequest by which certain of these details are regulated. In the first place regarding the amount of the endowment; it is provided in the bequest that this shall not exceed \$500,000 but in addition to the land and building fund the amount is not otherwise specified. The executors have thought proper, however, to appropriate this entire sum to the object specified and thus give the largest support possible to this institution. The yearly interest derived from this is about \$35,000 which is sufficient to support an institution of moderate scope such as has been already indicated, although it would be quite inadequate to maintain an university or general school involving a classical as well as a scientific course.

In this connection it may be well to state that for reasons of economy, as well as with a judicious regard to the interests of others it has been determined not to provide a preparatory department in the Stevens' Institute, but to make such arrangements in connection with the Martha Institute as would render the two establishments mutually supplementary to each other.

By this means students not already prepared to enter the Stevens' Institute may obtain in the Martha Institute the requisite preparatory education.

It is also proposed to establish a School of Design for women, by means

of which the benefits of the institution may be extended to this sex; but it is not intended to provide means of general education for girls in the Stevens' Institute, due provision in this respect existing already in the Martha Institute.

Courses of free instruction and lectures to mechanics, and also popular lectures on scientific subjects will be carried on in connection with the Stevens' Institute, and the latter it is proposed, to commence during the ensuing winter.

THE UNION DEPOT, NEW YORK.

ALTHOUGH this enormous pile is solely an emanation of engineering construction and will not possess any architectural characteristics, save the details of pilaster, dentiled cornice, and pediment, unaccompanied by unity of design as required in Architecture; we nevertheless think it worthy of notice on account of its extent and adaptability to the great business of the railroads for which it is to be the general depot. The *Tribune* thus describes it:

"The specifications for the iron work to be used in the erection of the car-house for the Union Passenger Depot to be built by the New York and Harlem Railroad Company, between Forty-second and Forty-fifth streets, Fourth avenue, and the new street west of the latter, in accordance with drawings made by Mr. I. C. Buckhout, Civil Engineer of the Company, were issued in this city on the 11th of March. The plans and drawings were photographed and sent to Europe, with a view of obtaining estimates; but the transatlantic iron-workers wanted too much money for the work. The plans were then submitted to American architects in iron, and on Saturday the Architectural Iron Works, foot of Fourteenth street, in this city, received the contract at a sum said to approximate \$1,000,000.

"The foundation of this immense structure, to be the largest of the kind on this continent, is well under way—in fact, nearly completed. The contract calls for the completion of the entire structure within eight months from its date. If not completed within the time specified, the contractor is to forfeit and

have deducted from the contract price \$500 a day for every day over; and if completed within the time specified, the contractor is to receive, in addition to the contract price, the sum of \$200 for each day the work is so completed and accepted by the engineer.

"It is impossible to give a description which will adequately convey an idea of the magnitude of this building. The weight of iron to be used will be over 8,000,000 pounds. It will require 100,000 square feet of glass in the roof alone, and 90,000 square feet of galvanized corrugated iron to cover the roof. The roof over the car-house will extend over an area limited south and west by the office buildings, east by the Fourth avenue, and north by a line 30 feet 6 inches south of Forty-fifth street. The entire length of the roof will be 652 feet, and it will be 199 feet 2 inches in width between the walls, and supported by 32 arched trusses, placed 20 feet 4 inches apart. These great arches will be set upon the foundation, whose upper face is 2 feet below the surface of the ground, rising to an elevation of 94 feet from the springing line to the extrados of the arch.

"The car-house is to be lighted through three skylights extending over the entire length of the roof—one on the center, double pitched, and two single ones on each side of the center. There will be seven courses of ventilators running the entire length of the roof, faced up with stationary sheet-iron slats. On the south end, the segmental portion of the arch above the brick wall will be faced

with cast-iron trimmings and plate-glass.

"The north end will be closed with a beautiful cast-iron front, highly ornamented. The east side, along the Fourth avenue, will be finished with cast-iron pilasters acting as casings set in front of each truss. These pilasters are to have bases and caps, supporting a main cornice along the front, and crowned by a cast-iron balustrade; a line of balconies will run along the west side and across the south end, connecting with the offices in the second story. The trusses are placed in heavy cast-iron shoes, 64 in number. To permit free expansion and contraction of the trusses, without interference with the side walls crossed by them, there will be placed cast-iron boxes or casings perforated by a series of cores and fitted together by means of bars and angles in such a manner as to insulate entirely the mason work from the trusses.

"The rafters will consist of five-inch deck beams secured to the top chord by double angle iron studs, $3\frac{1}{2}$ by $3\frac{1}{2}$ inches, and stiffened by diagonal braces of same size, riveted together and fastened on the chord by means of bent lap plates one-half inch thick, and riveted to the former. When completed, the upper part of the roof on the inside will present a perfect net-work of ties, braces, and other appliances to insure its stability. The ventilator on the ridge of the central skylight will be two feet wide in the clear, and will consist of two courses of cast-iron gratings. The trussed girders will also be constructed to perform the duty of ventilators. The main portions of the roof not covered with glass will be covered with corrugated galvanized sheet iron, No. 18 American gauge, lapped into each other at least four inches.

"The inside ornamentation will consist of pannels bordered with beads and scroll angle pieces, screwed to the plate iron. The inner chord of each truss will be encased in a cast-iron shell quarter-

inch thick, having the shape of a column ornamented with spiral bands, base, plinth, and astragals; cast-iron cornices will be run on both sides of the roof beneath the gutters and secured to ornamental brackets.

"A line of railing will run along the platform on the south, and with hoisting gates leading to the inner platforms. These railings will be three feet six inches high. The large and highly ornamental lamp posts will be placed in such parts of the car-house as may be hereafter designated.

"A heavy cast-iron cornice will be run across the segmental portion of the front at the south end, and a heavy pediment surmounting the cornice parallel to the truss and near it. These will be ornamented with dentils and modillions.

"The segmental space between the cornice and pediment will be faced up with ornamental cast-iron pannels, columns, and plate-glass half-inch thick.

"Along the Fourth avenue, on the exterior, will be placed a series of cast-iron pilasters, which will project six inches beyond the wall, be two feet two inches in width, and extend up to the cornice, which with frieze and astragal, will run the entire length of the car-house, the whole to be surmounted with a line of balustrade, the posts of which are to be placed over and in a line with each pilaster. The doors and windows will have cast-iron trimmings, all ornamented, the windows to be glazed with rough half-inch glass. The whole of the north front will be of cast-iron, the width to be 203 feet 10 inches, and raised 112 feet 6 inches in extreme height. The windows and doors of the first story will have rolling shutters.

"The ends of the structure will be occupied for offices on the first floor, while the ground floor will be set apart for ticket offices, passengers rooms, baggage lockers, restaurants, news stands.

"Pennsylvania iron, of the best welded quality, will be used for plates, flat or

square bars. Round bars and rods for braces to be of Ulster iron; rivets and bolts of charcoal iron. Sheet-iron best welded and refined Pennsylvania. Cast iron, mixed in the following proportions, viz:—American pig No. 1, and Scotch pig No. 1, 5 per cent of each for shoes, casings, lintels, box, angle, studs, and braces. American pig No. 1, 10 per cent, and Scotch pig No. 1, 15 per cent, for columns and pilasters. American pig No. 1, 15 per cent, and Scotch pig No. 1, 20 per cent, for hanging cornices, freizes, and flat panelings. American pig No. 1, 30 per cent, and Scotch pig No. 1, 30 per cent, for small moldings and orna-

mented work. All rolled and welded iron to be subject to a strain of 30,000 pounds per sectional inch.

"This depot is intended to accommodate the trains of the Harlem, Hudson River, and New York Central Railroads. For the latter a branch road will be built to connect with the Harlem, the trains being switched off in the neighborhood of Spuyten Duyvil. The car-house will have accommodations for twelve single trains, while, if it be necessary, double or even treble that number can be accommodated. If all goes well the Union Depot will be ready for opening to the public by January 1, 1871."

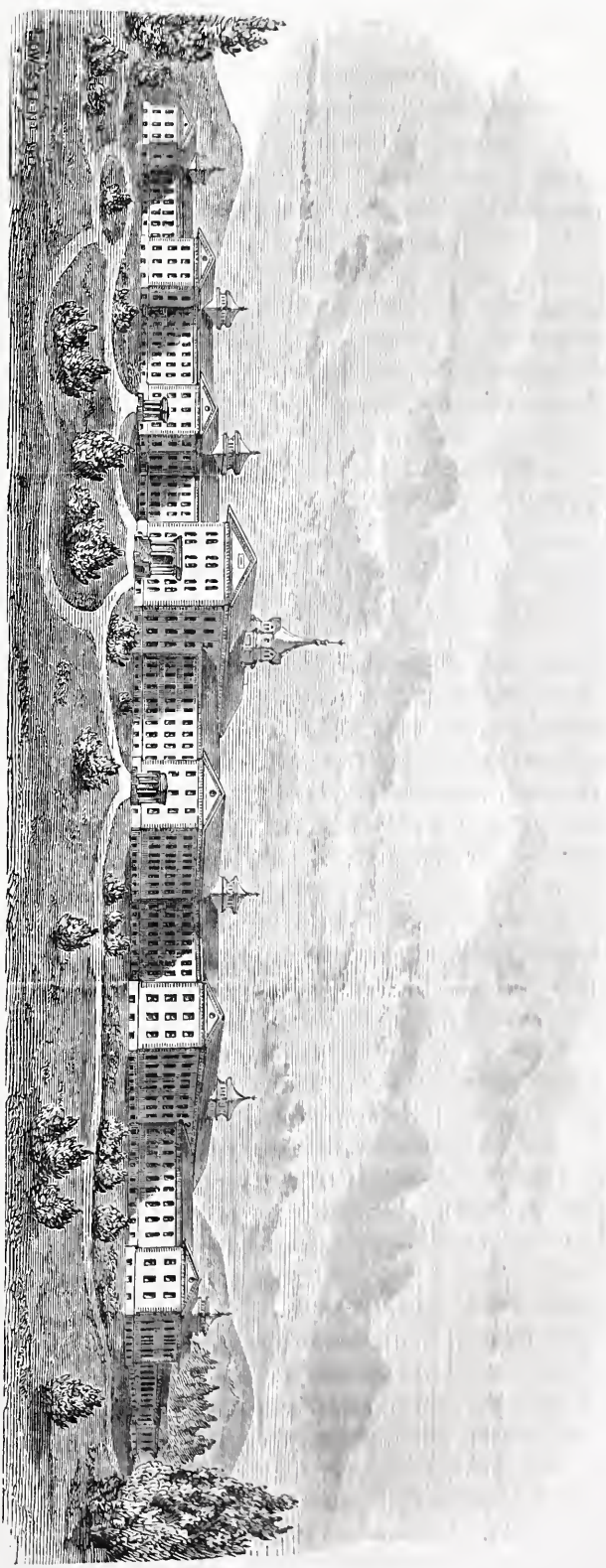
HOSPITAL FOR THE INSANE, ST. PETER, MINNESOTA.

IT is a melancholy fact that insanity demands the legislative intervention of each State in our Union, and that even our comparatively new States, with their paucity of inhabitants, are as much in need of these asylums, for bereft humanity, as are those of the old and overcrowded States adjoining the Atlantic sea-board. To what this fact is to be attributed, it is not our province to inquire; but, as it does exist, and that to an extent which calls for fit and proper buildings of suitable dimensions, all over the country, the subject becomes one in which our profession, in conjunction with that of the medical brethren, is bound to give all the attentive study which belongs of right, to the claims of so large a portion of the great suffering class of every community. Nothing speaks more favorably for the true civilization of a community than the state of perfection in which its hospitals of every class are kept, and there is not one among these that requires the unbounded sympathy of our people, more than does the hospital for the insane; for, their patients are, in the fullest sense of the term, our *protégés*, and we, as christians, their natural guardians.

Young as the State of Minnesota is,

its care, eight years since, was for its insane, for whom, not having any asylum yet, it was found necessary to make an arrangement with the State of Iowa, at a stipulated rate per week, for board and medical attendance, and accordingly, the first patient was sent to the Iowa Hospital, April 28, 1862.

For four years this arrangement was continued; but, as no more than a certain number could be sent there, it became necessary, in the Spring of 1866, to send them to St. Vincent's Hospital, at St. Louis, Missouri. The Governor of Iowa, having notified the State of Minnesota, that all available accommodations for the insane of his State were absolutely necessary, and that it was therefore desirable that the patients belonging to Minnesota should be removed at once; the legislature of the latter State, therefore, promptly passed "an act for the establishment and location of a hospital for insane in the State of Minnesota, and to provide for the regulation of the same." Four months afterwards the "State Hospital for Insane," was located at St. Peter's, in Nicollet county. The building at first used was an old dilapidated hotel, known as the "Ewing Hotel," with six lots, comprising a stone



HOSPITAL FOR THE INSANE, ST. PETER, MINNESOTA.

PERSPECTIVE VIEW, SHOWING THE COMPLETE DESIGN.

The center building and two wings are just constructed; to be followed by the remaining pavilions, as required.

building 60×32 feet, and three stories above the basement; attached thereto was a frame building 60×26 feet, and two stories high. All was done that was possible to make these concerns answer a temporary purpose. But, alas, the demand for increased accommodations became so urgent that in the following spring ('67), additional temporary buildings at an expense of \$40,000, were erected. Still the demand for room increased, and to so great an extent that the Board of Trustees resolved to employ a competent Architect, and commence at once the erection of a permanent set of buildings fully equal to the future requirements of the growing State. The consequence was the prompt commencement of the building herewith illustrated.

The object the Trustees have in view is the erection of a substantial, plain, and well arranged building, combining such internal facilities for heating, ventilation, water, machinery, etc., as experience and science have suggested as essential. Accordingly, when finished, it will present a plain exterior of hammered stone, broken range and well pointed, embracing a center building 60 feet by 120, with sections on each side, and returns, each 113 feet by 44. These sections may be increased in number (as shown) as the wants of the State may demand, and even extended to any number, this arrangement or composition cannot but prove harmonious as a whole.

The center building is to be four stories, and each of the sections three stories, above the basement. The laundry building, machine shop, etc., are in the rear of the center building.

The buildings have the advantage of a solid and dry foundation, standing as they do upon the solid rock, quarried out to make way for them. The location is well sheltered from the north and north-west winds by the rising ground and woods in that direction; while the aspect to the south and south-west is open; thus presenting all the desirable advan-

tages of the sun and the prevailing winds from those points in the summer.

The plan here adopted is found to be superior to all others, for the perfection it affords of ventilation and light, and the always adaptable form for additional wings, without at all interfering with the existing buildings.

The center building on the main floor is occupied by the superintendent's office on one side of the hall, and the parlor on the other. Immediately in rear of the Superintendent's office is the Steward's room, and opposite to it is the room for friends to visit patients. In rear of these two last mentioned rooms the corridor runs through the center of the sections, as well as through this building, and in it two flights of stairs lead to the floor above.

It may here be observed that the entire building is equally divided from the middle of the center building each way, into male and female departments.

Off of the corridors are the rooms for the patients, and at the ends of each pavilion are the clothes closets, water-closets, etc.

The work-shop is at the rear extremity of this center building, and next to it are the boiler room and coal cellar. The laundry and ironing rooms are next to these, they and the bakery and store-room occupying a building in the yard, connected by a passage with the main or center building.

The upper floors are laid out into patients rooms off of corridors very similar in plan to the first floor just described.

The hospital, when completed, will accommodate four hundred patients.

The supply of water is most amply procured from a pure lake, distant some four miles, and elevated one hundred and sixty feet above the base of the building. There is a bluff about an eighth of a mile from the rear of the hospital, on which a reservoir eight feet in diameter is located (underground). It

is two hundred feet long; and, as it is sixty feet below the level of the lake, the head thus obtained is sufficient, with an eight inch iron pipe, to drive two six inch turbine wheels. One of these is attached to ventilation fans, and the other runs the machinery in the laundry and workshops.

The practical saving over the ordinary steam engine for this purpose is considerable; in fact it may be stated at three thousand dollars per annum; and in durability and economy of repair it is most advantageous.

Before we close this description we will give, for the use of those architects who may be called upon to design such institutions, the following series of propositions adopted by the association of medical superintendents of American institutions for the insane, in order that they may make their plans conform to the expressed opinions of that distinguished body.

I. Every hospital for the insane should be in the country, not within less than two miles of a *large town*, and *easily accessible* at all seasons.

II. No hospital for the insane, however limited its capacity, should have less than fifty acres of land, devoted to gardens and pleasure grounds for its patients. At least one hundred acres should be possessed by every state hospital, or other institution for two hundred patients, to which number these propositions apply, unless otherwise mentioned.

III. Means should be provided to raise ten thousand gallons of water, daily, to reservoirs that will supply the highest parts of the building.

IV. No hospital for the insane should be built without the plan having been first submitted to some physician, or physicians, who have had charge of a similar establishment, or are practically acquainted with all the details of their arrangements, and received his or their full approbation.

V. The highest number that can with

propriety be treated in one building is six hundred and fifty, while six hundred is a preferable maximum.

VI. All such buildings should be constructed of stone or brick, have slate or metallic roofs, and as far as possible be made secure from accidents by fire.

VII. Every hospital having provision for two hundred or more patients, should have in it at least eight distinct wards for each sex, making sixteen classes in the entire establishment.

VIII. Each ward should have in it a parlor, a corridor, single lodging rooms for patients, an associated dormitory, communicating with a chamber for two attendants; a clothes room, a bath-room, a water-closet, a dining-room, a dumb-waiter and a speaking tube leading to the kitchen or other central part of the building.

IX. No apartments should ever be provided for the confinement of patients, or as their lodging rooms, that are not entirely above ground.

X. No class of rooms should ever be constructed without some kind of window in each, communicating directly with the external atmosphere.

XI. No chamber for the use of a single patient should ever be less than eight by ten feet, nor should the ceiling of any story occupied by patients be less than twelve feet in height.

XII. The floor of patients' apartments should always be of wood.

XIII. The stairways should always be made of iron, stone, or other indestructible material, ample in size and number, and easy of ascent, to afford convenient egress in case of accident from fire.

XIV. A large hospital should consist of a main central building with wings.

XV. The main central building should contain the offices, receiving rooms for company, and apartments entirely private, for the superintending physician and his family, in case that officer resides in the hospital building.

XVI. The wings should be so arranged that if rooms are placed on both sides

of a corridor, the corridors should be furnished at both ends with moveable glazed sashes, for the free admission of both light and air.

XVII. The lighting should be by gas, on account of its convenience, cleanliness, safety and economy.

XVIII. The apartments for washing clothing, etc., should be detached from the hospital building.

XIX. The drainage should be under ground, and all the inlets to the sewers should be properly secured to prevent offensive emanations.

XX. All hospitals should be warmed by passing an abundance of pure fresh air from the external atmosphere, over pipes or plates, containing steam under low pressure, or hot water, the temperature of which at the boiler does not exceed 212 degrees F., and placed in the basement or cellar of the building to be heated.

XXI. A complete system of forced ventilation, in connection with the heating, is indispensable to give purity to the air of a hospital for the insane, and no expense that is required to effect this object thoroughly, can be deemed either misplaced or injudicious.

XXII. The boilers for generating steam for warming the building should be in a detached structure, connected with which may be the engine for pumping water, driving the washing apparatus and other machinery.

XXIII. All water-closets should, as far as possible, be made of indestructible materials; be simple in their arrangement, and have strong downward ventilation connected with them.

XXIV. The floors of bath-rooms, water-closets, and basement stories, should as far as possible be made of materials that will not absorb moisture.

XXV. The wards of the most excited class should be constructed with rooms on but one side of a corridor, not less than ten feet wide, the external windows of which should be large and have pleasant views from them.

XXVI. Whenever practicable the pleasure grounds of a hospital for the insane should be surrounded by a substantial wall so placed as not to be unpleasantly visible from the building.

MECHANICAL DRAWING SCHOOL.

MASSACHUSETTS, always foremost in everything pertaining to intellectual and educational progress, has now been stirred up to an effort which will, we sincerely trust, eventuate in the general adoption by all the State legislatures, of public Mechanic Drawing Schools. The *Massachusetts Ploughman*, of a late date, has the following observations on this subject:

"A report was submitted to the legislature last week, by the Board of Education, in obedience to a resolve of the last Legislature, relating to provisions for free instruction in mechanical drawing in the cities and large towns of the Commonwealth. After reciting the petition which led to the passage of the act, the report says that being impressed with the importance of the subject on account of its relations to the improvement of our system of general and popular education, no less than of its vital connection with the successful progress of the varied manufacturing industries of the Commonwealth, the Board referred said petition and resolve to a special committee consisting of Messrs. David H. Mason, Gardner G. Hubbard, John D. Philbrick and the Secretary, with instructions to make all needful inquiries and investigations, and to report their conclusions thereon for the consideration of the Board. This committee addressed a circular to gentlemen well instructed on the subject, desiring them to reply to certain questions therein contained. In most cases, very elaborate and prompt replies were received, giving valuable opinions and plans as to the best methods of instruction in mechanical drawing. These documents are annexed to the report. The report of

the committee was adopted as an expression of the views of the Board, and it was voted that a recommendation be made to the Legislature to pass an act requiring elementary and free drawing to be taught in all the public schools of every grade in the Commonwealth, and

which shall further require all cities and towns, having a certain number of inhabitants (to be fixed) to provide for giving annually free instruction in industrial and mechanical drawing to men, women and children, in such manner as the Board of Education shall prescribe."

CONSTRUCTION OF FLAT ROOFS.

THE oriental custom of having flat-roofs as covering for buildings prevails in all our cities, for the simple reason that our climate is mild enough to admit of it, and our abundant supply of timber enables us to construct such roofs with the greatest facility, and of a strength equal to the span.

Where there is a considerable depth of building to be roofed, and the width of that building is within fair limit; or that solid partition walls are carried up so as to help sustain the roof (even though the entire span be too great for ordinary practice), it is usual in cities to have recourse to the plan of sloping the roof from front to rear, giving just sufficient drip to carry off the rain water freely. This sloping flat-roof, as it may be termed, is formed of joists similar to flooring, only wider apart, sixteen inches from center to center; in which case the ceiling may be laid on the under side of the joists, the length of a lath being forty-eight inches; or three sixteen inch spaces. But, as is generally the case, a level ceiling being requisite, ceiling joists are used, and consequently the roofing joists before spoken of, may be as much as twenty-four inches apart, from centers.

These roofs should be sheeted over with rough inch boarding laid close. Hemlock, spruce or white pine (which ever is cheapest) may be used for this purpose.

Flat, platform, or other roofs, are covered on this boarding with either galvanized iron, lead, tin, zinc, cement

or prepared canvass. All of these coverings require competent strength of construction to bear the weight imposed upon the roof. They also require very accurate workmanship to make the covering weather-tight and to guard against expansion and contraction.

The cheap coverings for flat-roofs are all much the same in principle; namely, tar and sand on paper or felt, and finished with a coat of gravel. These preparations are manufactured in rolls like wall papering, and when laid down on the boarding and lapped over on each other carefully, are then coated with boiled tar and sanded. Finally, as stated, the whole is covered over with coarse gravel made hot, so as to adhere the more readily to the tar.

Although this mode of covering is undoubtedly economical, it is by no means desirable, owing to the action of the sun on it in midsummer, and the frost in midwinter. Moreover, the gravel will get loose, and high winds will scatter it in such a manner as not alone to leave the roof bare in many places, but to endanger the breaking of glass in windows and skylights.

It is to be hoped that cement roofs will yet be constructed, on which garden mould may be bedded and parterres of flowers, or even bleaching plats be added to the household comforts of our crowded streets and thickly builded lots.

Certainly there is a great amount of taste and comfort to be thus secured, and it is worthy the trial.

INTERESTING TO ARCHÆOLOGISTS.

IN a paper from Dr. Hayes, read before the American Institute of Science, on "The Northmen of Greenland," he referred to his visit to Greenland last Summer with the artist Bradford, to explore the region once occupied by the Northmen. Beautiful photographs of this region were handed among the audience. These seem to me more expressive of the singular purity and stillness of those Polar scenes than any paintings can be. The prismatic clarity of ice tints cannot be reproduced by pigment, and the exquisite shading is shown best in black and white. The pictures were soft and lovely to a degree. The most important was the ruined church of Krakotok. Dr. Hayes made it his first object to visit this ruin, which had not been explored since 1828. It stands on the bank of a lonely fiord, forty miles in length by five wide, extending to the base of a lofty mountain chain which, keeping back the glaciers of the inland region, are the cause of a greatly modified climate, as no icebergs come into the sea in that quarter. The banks of the fiord slope gently half a mile to the base of high cliffs of metamorphic rock. These slopes are clothed with verdure, and the scene is Summer-like and picturesque. The church stands on such a slope, surrounded by small scrub willows, birches, and juniper bushes. The grass was very rich and musquitos abundant. The church walls were rough, and mostly unhewn stone, $4\frac{1}{2}$ feet thick. The doors and several of the windows are still perfect. The window over the chancel has a perfect Norman arch. This was in the east, and orientation was perfect. The walls are still perfect to from ten to eighteen feet elevation. The church itself was not large, being fifty-three by twenty-eight feet. It was surrounded completely by a wall, forming a churchyard, in one corner of which was the almonry. From this, extending to the

west, the wall enclosed the priest's or bishop's house, which is still somewhat perfect. On the north side the buildings were sheltered by a cliff about as high as the church-top. Near the church there were the remains of a round structure forty-eight feet in diameter, which may have been a tower; five other buildings lay in the immediate vicinity, all equidistant from the beach, the church itself standing one hundred and sixty-five feet above high water mark. The ruins of ancient buildings were found dotted along both banks of the fiord, but are here less numerous than they are on the southern branch of the fiord, which extends farther into the interior, and reaches to the early settlements of Gaidas and Brattalid. At this latter place there is a church ruin in the form of a cross, which was probably the cathedral where, as is known from the old Icelandic records, seventeen successive bishops administered the ordinances of the Church of Rome, the first being appointed in 1117, the latter in 1406. In conclusion, Dr. Hayes said: "Among other matters of scientific value, I discovered extensive beds of coal in Greenland, showing how different, in a former geological epoch, must have been the climate. Let us hope that the Government will see the importance to science in a further exploration of those interesting and mysterious regions of the Pole."

PRESERVATION OF FREESTONE.

ALTHOUGH quick processes, whereby time and capital are saved and labor diminished, are considered valuable in most branches of manufacture, the saving of time in the formation of ruins, however Gothic and picturesque they may be, is certainly not desirable where it concerns our brown stone houses. The question of the preservation of stone buildings has occupied much attention of late, especially in England, where the Houses of Parliament, which were built

only a few years ago, already show signs of decay, and many methods for arresting their destruction have been tried and patented. Time alone can show the value of these patent methods.

In regard to the cause of the scaling of the brown stone so much used of late in this country, it would seem to be chiefly due to its porosity, whereby it absorbs water, which, in freezing beneath the surface, splits it apart by the expansion which water undergoes at temperatures below 39° Fahrenheit. This force of expansion is very powerful, as is shown by the rupture of water pipes, which so often burst in cold weather. It is frequently the case that these pipes do not crack until the temperature moderates and melts the cylinders of ice contained therein, and this has given rise to the delusion that it is the thawing which bursts them.

It has been theorized that the decay of the stone is due in part to the corrosive action of the sulphuric acid which exists in the atmosphere of large cities, proceeding from the coal there burned. Even if this theory be correct, the acid could not affect the stone unless absorbed into its pores with moisture. Stop these pores therefore, and the decay will be arrested. For this purpose the "Permanent Wood Filling" is confidently recommended, for it affords a sure protection against dampness whenever it may be applied. Oil has been used on walls of brick and stone, but it soaks away before drying, and leaves but little at the surface where it is most needed, while the "Filling," being more viscid, remains in the surface pores until it hardens and closes them forever. This article, like most modern discoveries, was known in principle before the Christian Era, and if Sextus Tarquin had not scowled on the Gypsy we might perhaps have found in the Sibylline books the formula for its preparation. It is at least certain that the asphaltum, which enters into its composition, was used by the Egyptians to preserve their dead, by

impregnating the bandages in which they wrapped the bodies to make mummies; and after a trial of four thousand years, we are justified in calling this species of dry pickle *permanent*. In the fossil gums, moreover, which are also used in its composition, we find insects and leaves which have been handed down to us from antediluvian times, and which would indicate the preserving qualities of those gums. Is it not probable that if frail organic remains have been thus preserved by its ingredients, that they will as well protect a hard stone wall? To us, it seems that nothing can be more durable than a surface composed of the elastic "Filling," closing the pores of the stone, and the hard silicious cells of the latter guarding the "Filling" from abrasion. The motives of reformers are often assailed, but the principles of natural philosophy are here in question and not the principles of men.—*The Hub*.

WOODEN WATER-PIPES.—Water-pipes of wood are still used; and on the score of cheapness they have a certain utility above other materials. A very economical mode of manufacturing wooden water-pipes is now practised in an establishment at Ithaca, N. Y. The pine or other lumber, sawed into lengths, is by peculiar hollow augers, cut or bored out in concentric tubes or pipes, only leaving at last a small core, a little less than the bore of the smallest pipe. In this way a piece of timber, originally ten inches in diameter, will *turn out* several pipes 10, 8, 6, 4, and 3 inches in outer diameter, and about 1½ inches in thickness, or of greater thickness if required, by decreasing the sizes of the inner tubes proportionately. The hollow auger cuts away only from one-half to three-quarters of an inch. This piping is then properly strengthened by iron bands, and subjected to a bath of asphaltum or other cement to make it impervious to gas or water, and to prevent decay.—*Am. Artisan*.

A SERIOUS UNDERTAKING.

MR. THOMAS PAGE, C. E., has read a paper to the Society of Arts on his plan for a submarine tunnel across the British Channel.

He proposes to sink, between Dover or the South Foreland and Cape Gris-
nez ($17\frac{3}{4}$ nautical miles), eight conical wrought iron shafts, the longest about the height of Westminster Abbey towers, these shafts to be two miles apart, and consisting of an inner and an outer casing, the space between to be filled in with concrete after they are sunk and fixed or imbedded, and embanked also round with concrete to a height of thirty feet on a base of forty-five feet all round. A net work of moored chain cables would also help to secure them. Lighthouses would be placed on the tops of these shafts, at a height of one hundred and eighty feet above low-water mark.

The shafts being in place, the bed of the sea would be brought to a fair surface by the operation of divers, who would be enabled to work without pressure on their lungs or their bodies; but into the particulars of this system (said Mr. Page) I do not wish to enter, as it is a special arrangement for such purposes of operating in deep water.

The next operation is that of sinking and bedding on the bed of the Channel, the tubes or construction for the railway. These may be for a single line or a double line. I will refer to the double line at present, and then describe a tube, the joint of which is patented by Mr. Williams, of Liverpool, by means of which the tube, moving on circular joints, can take an elastic position, and all the junctions can be made above the surface of the water, while the remainder of the tube is bedded in the sea.

The space between the shafts being divided into lengths, say of a quarter of a mile each, and heavy iron frames fixed in the bed of the Channel by the divers;

the lengths of tubular sections which I would propose to submerge at one time are $\frac{1}{4}$ mile, 1,320 feet, a little more than the length of Waterloo Bridge. Eight of these lengths being sunk and covered, complete the distance of two miles, and if a sufficient power and a sufficient number of operators were provided to commence from each shaft, the whole between two shafts would be done in half the time; and it is equally certain also that nine times the power and operators would complete the whole distance between Dover and Cape Gris-
nez in the same time as would be required for joining the two shafts.

The gigantic nature of the work and the magnitude of its details require corresponding means of execution, both in the steamships and other vessels, for placing the shafts in position, and for embedding the lengths of tube in their proper places in the bed of the Channel, as well as for all the operations for filling the spaces between the outer and inner rings of the shafts with concrete, in forming the banks of concrete round the shafts, and in covering with concrete the submerged tubes immediately they are placed in position. It is by an excess of power and means, in steamships and other vessels, in operators, and in materials for forming concrete, that the progress and completion of the work can be accomplished with rapidity and economy. Thus to cover a length of tubular section a quarter of a mile long, in two hours of the tide, would require 1,500 men; to fill the space between the rings of each conical shaft would require five hundred men for two hours' work; and to form the bank of concrete round each shaft would require three hundred and fifty men for the same time.

The cost seems to have been estimated at 8,000,000*l.*; or rather Mr. Page's plan

was devised on an understanding with Mr. Newman, of the firm of Freshfield & Newman, that if he could stake his professional reputation on a plan that could be completed for 8,000,000*l.*, there would be no difficulty in providing the funds for its execution.

In the discussion which followed the reading of the paper, opinions were expressed *pro* and *con.* as to the practicability of the scheme. Mr. Brassey was amongst the speakers. He said that so far as he had been able to understand the project, it was one of such a gigantic and exceptional character as he had never before heard propounded. No engineer had ever attempted anything of the kind, and he very much doubted whether it would succeed; his impression was that it would not. He did not think it was possible to sink the tube, as was proposed, to the depth of some two hundred feet by any means yet known; and to attempt to do a thing so gigantic without greater experience would be a very hazardous experiment to say the least of it. He agreed with Mr. Bateman (who had previously spoken) that it was impossible for miners to work at a depth of two hundred feet. Therefore, with no experience to guide them, he thought it was a bold matter to attempt to execute such a project, and no wise man would attempt it.

Mr. Page said Mr. Brassey's objection as to divers working two hundred feet below the sea, without undue pressure upon their lungs and bodies, was very easily answered. Supposing the room in which they then were was at the bottom of the sea, and the walls were carried up above high water, would any one dispute that they could send out a diver from that room into the sea, passing through a sort of valve-cupboard into the sea, and give him only atmospheric pressure, with perhaps a pound or so more. He had devised a dress for this purpose, by which all pressure was removed from the body. That being explained, all the difficulty about divers

operating in deep water was removed. As to want of experience, all great engineering feats had been carried out without previous experience.—*The Builder.*

LIME BURNING.—The Limestone quarries at Rockland, near the mouth of Penobscot Bay, Maine, are at present worked on a more extensive scale than ever before. The old fashioned kiln for burning the limestone has been entirely superseded by the patent perpetual kiln, and a large amount of capital is invested in the business. The kilns are situated on the shore of a peninsula, and are built at the foot of a bank and at the head of a wharf. The kilns are constructed with walls of thick granite and lined with fire-brick, being eighteen feet square and thirty feet deep, narrowing towards the lower part. Each kiln will hold from one hundred and fifty to two hundred casks of lime, and a charge of limestone rock and fuel is burned in from seven to eight hours, and is drawn three or four times a day, according to the character of the rock. The lime, it is stated swells in the kiln, and prevents the unburned portions from falling down. When the lower layer is sufficiently burned, iron rods are run into the furnace, and the lime, in large glowing red lumps, is removed by means of long handled shovels, and when cool is broken up, sorted and packed in casks. The fuel is either wood or bituminous coal, the kilns using one cord of wood or two tons of bituminous coal to produce the same yield. One hundred casks of lime consume in their manufacture four and a half cords of wood. The kilns and the fuel are covered by large sheds, the buildings for a pair of kilns occupying an area of seventeen thousand square feet.

THE *Times* says that the new Presbyterian Hospital in New York will be, when completed, "one of the most elegant public edifices" in the city.

WASHINGTON CITY CHURCH—CHURCH BUILDING.

BISHOP McTyeire writes to the Nashville *Christian Advocate*, since his recent visit to the Baltimore Conference:

The Church in Washington City is entitled to connectional consideration. It is our representative at the National Capital—a convenience, a necessity. Eligibly located on Mount Vernon Place, the size of the building suits the demands on it. We have but one, and it ought to be large. With the three galleries it will seat twelve hundred people. I am told fifteen hundred were present, comfortably, at the dedication last year. No bricks have been spent on towers or steeples, though the substructure and plan allow of these whenever the times will. The outside appearance is, nevertheless, imposing and appropriate. The galleries are the best I ever saw. They seem a part of the house, and not an improvised seafolding, as most galleries do. Those occupying the comfortable seats there are seen and felt by the preacher to be a portion of the congregation, in full view, hearing and sympathy. The arrangements for lighting and ventilating are ingenious, and leave nothing to be desired. The same may be said of the pulpit and altar. In most of our church-buildings there is seldom a success in the last item. The altar-railing is elliptical and not circular; not deep from the pulpit, but reaching beyond it, on both sides. This arrangement saves that dead space between the pulpit and first pews, which both increases the labor and discounts the effect of speaking. The basement is well arranged not only for the use, but the usages of Methodists. Here I found, notwithstanding the unfavorable weather, a large and well appointed Sunday-school under the superintendence of that excellent layman, Brother Zimmerman.

Let me drop a hint to our brethren

who are building churches—for this is a church-building era with us, and I suppose that on a yearly average, at least one a day goes up in city, village, or country. The Architect of this “amiable tabernacle” is S. T. Morsell. He lives in Washington, and is one of the most active and useful members of our Church. It will pay, in more ways than one, to send to him for a plan, if you propose building a church that is to cost, say \$5000. Ay, and to obtain, if possible, an occasional visit from the Architect, to superintend the carrying out of his plans and specifications.

It grieves me to witness the blunders, expensive as well as deforming, which some of our friends, more energetic than skillful have made in church-building. To say nothing of taste—a crack in the wall, a defective roof, an unnecessary opening or two, a second-thought change of plan as unforeseen necessities or inconveniences are developed, will often cost more than an architect’s services. There is something too, in having a *Methodist Architect* for a Methodist church. Many of this craft have ideas of ecclesiastical Architecture not in harmony with our practices. Methodism is a typical institution; and its type is Doric, not the flowery Corinthian, not the slender Ionic, nor the affected Gothic. There are several touches and appointments about this Washington Church of ours that nobody but a Methodist Architect would have devised.

But I would bring this enterprise before our people for another reason—it needs their help and deserves it, and must have it. The Fourth of July collections in its behalf were meagre, hardly affording appreciable relief. I made one myself and sent it forward, but not such as I would now try to make upon this occasion. That old tabernacle, *ante-bellum*, was before me, dingy, small, in

an out-of-the way place, nor could I get it out of my way. This latter house is worth asking aid for. The Washington brethren have commissioned an agent to gather aid from our people for an enterprise which is ours as well as theirs. But they have not sent him out without first doing their full share. They have been liberal according to their means, if

not beyond; they have done what they could. It may be said of them, as St. Paul said of the Macedonian Methodists: "How that in a great trial of affliction the abundance of their joy and their deep poverty abound unto the riches of their liberality. For to their power, I bear record, yea and beyond their power, they were willing of themselves."

THE GREAT PYRAMID.

A LECTURE on the Great Pyramid of Egypt has been delivered before the members of the Hartley Institution, at Southampton, England, by Col. Sir Henry James, R. E., director-general of the Ordinance Survey. Sir Henry entered at some length into the details of measurement of the Great Pyramid, pointing out its perfect exactness, and said that many enthusiastic gentlemen imagined these beautiful proportions must have been the result of superhuman labor, following out this idea in a manner which excited the admiration of those who were their followers, and the ridicule of those who were not; among the latter of whom he included himself. In passing, the lecturer exhibited an exact representation of what he said was the most interesting piece of wood in her Majesty's dominions—the wooden cubit measure found in Egypt, and now deposited in the British Museum, and which was more than 3,200 years old. Having remarked that he had a copy of this measure sent out to Egypt to Sergeant-Major Macdonald, with instructions to measure the pyramid, and stated one or two of the results thereof, Sir Henry went on to say that the side of the square base of the pyramid was equal in length to 760 English feet, and his experience was that people had a very imperfect idea—a difficulty of realizing such dimensions. The stone used for the facing was of a better class than that which formed the inner portion of the building, and to give an idea of the

recklessness of cost, so to speak, and the tremendous indifference to any amount of labor which characterized the old Egyptian kings, the lecturer said they, at enormous pains, had large stones brought from the opposite side of the Nile, and placed in their present positions. They were, too, very clever as architects; for instance, in the king's chamber inside the pyramid there were stones thirty feet long, placed one over another; these stones were not found in Lower Egypt at all; but although some were ninety tons in weight, they were brought in vessels 500 miles down the Nile, carried, across great causeways, and then placed in the pyramid 100 feet above the level of the ground. Then, again, as to the finish, this Syenite stone was of the very hardest known, and yet it had been polished and built in to form a casing for the king's chamber with such an exact skill and so high a finish, that the finest piece of tissue paper could not be put between the joints, and this in a place built 4,000 years ago for no other purpose than to hold the body of one man. If there was one thing which more than another he admired in the construction of these pyramids, it was the extraordinary manner in which the builders introduced the principle of counterbalancing, by which, he believed, the stones were raised to their positions. Sir Henry explained the process by the aid of a model, made by Corporal Goodwin, R.E., who worked it on the platform.

COMMUNICATIONS.

ON THE PROPER CONSTRUCTION OF FIRE-PLACES.

THERE are two methods in use for warming apartments of dwellings and other buildings; one by radiant heat the other by hot air. The first of these may be termed the natural, the second the artificial method.

It is a law of nature, established as are all such laws, for a wise purpose, viz: that radiant heat passes through the atmosphere in straight lines, *without heating it*. Calorific rays or radiant heat "pass freely through a vacuum and the air, without being arrested by the latter or in any way affecting its temperature" (see Gregory's edition of Turner's Chemistry). "The fire of a fire-place warms us at a distance, without heating the intermediate atmosphere, and even should this intermediate atmosphere be agitated and rapidly renewed, the effect is not perceptible; but the rays of heat pass through the atmosphere to warm us, without being arrested by it" (see Pouillet's Elements of Physics). Thus a person occupying an apartment with an open fire on the hearth, is warmed not by an atmosphere of hot air, but by rays of heat emanating directly from the fire and impinging on the surface of his body. The air of the apartment is warmed to some extent by being in *contact* with the walls, chairs, and tables, and other objects which have been themselves warmed by radiant heat but it is not hot air; therefore the air respired in such an apartment is not hot air; and so on a hot summer day, the thermometer in the sun will indicate a temperature of 140° F., at the same instant that another thermometer in the shade within a distance of a few feet, will indicate a temperature below 100° F., the air from the one in the sun blowing on that one in the shade, showing that the higher temperature is derived from the rays of the sun striking upon it, and not

from heated air; and if a thermometer thus placed in the shade is protected from indirect radiation, it will indicate a much lower degree than 100° F. Thus when walking in the sun in this climate, in a temperature of 140° F., we are not respiring air of that heat, for that would not be endurable. Our animal heat is generated by the vital processes throughout the circulation of the blood, but for the most part, perhaps, in the lungs, where the temperature in a state of health is about 98° Fah.

This peculiar characteristic of the atmosphere, in its relation to radiant heat, is one of the means adopted by nature, to relieve the lungs from the evil consequent upon the respiration of heated air, and we should be careful not to counteract it in planning for warming our dwellings.

The physical properties of the atmosphere in its relations with heat, have not been sufficiently regarded in adopting modes of warming and ventilating dwellings and other buildings. Hot air, admitted from a heating apparatus into a cold apartment, being lighter than the cold air of the room, ascends in currents, displacing this cold air in its ascent, which it forces downwards; and this hot air is itself being constantly displaced by the fresh hot supply. The hotter ascending, the cooler descending. Thus a somewhat regular circulation of air is maintained, so long as the hot supply continues, or until an equilibrium is gained between the upper and lower strata. But when the apartment becomes crowded with persons, the exhalations from the lungs, and from the skin, and from dirty clothes, which, long worn, are saturated with animal excretions, in a short space of time change the condition of things in the apartment.

Of these exhalations, some are heavier than the atmosphere, and gravitate towards the floor; others being lighter, ascend with the hot air from the heaters. But the entire volume of the air of the apartment, swayed to and fro by the various movements of the crowd, and the opening and closing of doors, soon becomes, as it were, of a uniform impurity; the fresh and the foul air becoming thoroughly intermixed, and all alike pestiferous. Does not this simple illustration go to show the difficulty, if not impossibility of subjecting hot air to control in warming apartments?

Heated air on escaping from the flue into the room instantly takes an upward course, and a person within three feet of the ascending current, is not warmed by it, nor, until the entire volume of air of the room is displaced by this heated air.

But how is it with radiant heat? Radiant heat proceeds in straight lines, perpendicular to the surface from which it is emitted, and is therefore to be controlled. By the use of a stove, we have both heated air and radiant heat. The radiant heat proceeds in all directions, straight from the surface of the stove, and reaches the person remote from it. The air in contact with the stove becomes heated by this *contact*, and thus being lighter than the air above it, rises in a current, and the adjacent air rushes into its place; this also coming in contact with the stove, ascends to give place to other air, and so, a regular circulation is maintained; the hot air ascending the cool descending; and the surrounding air rushing in, causes a motion towards the stove from all sides of the room. In this way, with but little air required in a stove to feed the flame, there is great heat, with but little ventilation, and hence an unwholesome atmosphere. This engenders an entirely different state of things from that which exists in a room with a fire on the hearth. For in this latter case there is but little heated air, and great ventilation. But comparing the three methods

of warming, the last, or that of an open fire on the hearth, presents the least objection, at any rate for private apartments.

In a room heated with a supply of hot air from without, the difficulty is, in so admitting the fresh heated air, as not to have it intermix with impure air of the room, and at the same time, to expel or get rid of the impure air. In a stove room the great difficulty is, too great heat and no ventilation. In a room with an open fire, we have to contend with too free and uncontrollable ventilation. If this last can be obviated, we have in the open fire the most delightful of all methods of warming and ventilating private apartments.

It is, however, a lamentable fact, that when fashion and health are brought into conflict, fashion will carry the day. Hence the futility of pleading health against fashion. Hot air furnaces are in universal use for warming buildings, both public and private; and fires for warming by radiant heat are exceptional. Indeed, the hickory fire on the hearth is so seldom seen now, that it is a wonder. Hence but few fire-places are constructed in modern houses, and those that are constructed, are but little if at all adapted for the use of wood; while their hearths being small, and flues also of small capacity, they are dangerous.

On the first introduction of anthracite coal, about the year 1822, the dwellings and public halls of Philadelphia, were warmed by means of large stoves, and coal grates. After this, came parlor stoves and hot air furnaces.

From the long disuse of fire-places, but few bricklayers and masons understand the proper principles for their guidance, in the construction of open hearths and chimney flues for wood fires.

We have had much theorizing on warming and ventilating dwellings and public halls, which has not yet given as a result, satisfactory contrivances for these purposes. On the contrary, the

discomfort and ill health clearly traceable to the use of hot air furnaces in dwellings and halls, seems to be leading many among our wealthy classes, to the use of fires of wood on the hearth, if not exclusively, as adjuncts in parlors and chambers for warming and ventilating. Owing, however, to the vicious construction of hearths and flues, smoky chimneys, and the disgust of proprietors are the inevitable consequence.

The following suggestions may be of service to such as desire to enjoy a hickory fire on the hearth.

The points to be considered in constructions for open fires, are the fire-place or hearth, the flue, and the foundation. The fire-place when completed should be lined with iron, back and sides, and have a soap-stone floor and marble slab or hearth-stone in front. It should measure when finished not less than twenty-eight (28) inches across the back, and three (3) feet across the front opening, and the depth should not be less than from sixteen (16) to twenty (20) inches. The hearth-stone should be in length, equal to the width of the breast of the chimney, and in width thirty (30) inches, measuring from the front face of the jambs. The foundation for these parts should be wide enough (that is measuring from side to side,) to support all the fire-places and flues of the several stories which compose the stack; and deep enough (that is, measuring from front to back) to support the hearth-stone as well as the fire-place of the lower floor. In general this hearth-stone is laid in mortar upon strips of wood resting from the breast against the trimmer; but this, from its proximity to the fire-place, is a frequent cause of damage from fire. Up stairs this arrangement cannot be avoided, unless by using bars of iron instead of wood. In a three storied house, where a fire-place is required on each floor, through which the stack passes, we must allow two feet six inches for the fire-place on the upper floor; thirteen inches square for each of

the two flues which pass it; and four inches for the withs or partitions between the flues, and four for the sides of the flue, requiring a total width of foundation for the stack of six feet. The depth required, from front to rear, for the foundation to support the stack, as well as the hearth-stone, will be (allowing nine inches for the thickness of the back of the flue) four feet eight inches (4 ft. 8 ins.).

The height of the opening of the fire-place, that is from the bottom edge of the breast to the hearth, should not be greater than twenty-eight (28) inches; the lower the stronger the draught. In France, fire-places are furnished with a rolling shutter of iron, which can be raised and lowered to any desired height under the breast, to suit the state of the atmosphere, and the draught of the chimney. During the absence of persons from the room, this shutter may be closed tight as a safeguard against fire. A smoky chimney may be cured by this arrangement; or by lowering the height of the opening by the intervention of a strip of soap-stone or sheet-iron.

The next point to be considered is the throat or lower end of the flue. The back of the fire-place is to be built plumb from the hearth, and the back of the flue plumb over this; which would leave the throat of the chimney thirteen inches by the width of the back of the fire-place. But the area of the throat should not be greater than the area of the flue, which has been stated at 169 inches, and therefore the reduction of the opening is made by building a four inch wall against, and in front of the back of the fire-place as high as the under edge of the breast, and coping this with a soap-stone six inches square, and of the length of the throat; by this means, and by the gathering at the sides above the place of the iron jamb pieces, the area of the throat may be reduced to that of the flue, about seven (7) by twenty-four (24) inches. After this, the back and jambs being placed and the

hearth and hearth-stone laid, the fire-place will be so far completed. The soap-stone at the throat should be so wide as to be flush with the face of the iron back which is under it; and the upper surface of the soap-stone should be left square and horizontal like a shelf.

The gathering at the sides in a short space reduces the flue to an area of 13 by 13 inches, and from this point, which is the upper end of the funnel, the flue should be built up as straight as possible, allowing for passing by the side of the fire-place above, and should be of an even area throughout to the top. The withs or partitions should not be less than four (4) inches, and the interior of the flue should be thoroughly pargetted. The stack should be covered with a stone slab overhanging it on every side six inches, with a hole cut through for each flue. It is important that the outer edge of this slab should be well sloped on its upper surface, so as not to afford a resting place for the smoke, which otherwise, in a dull day, might remain and draw back into the flues.

There is a wide difference of opinion regarding the shape of smoke flues. Some architects require a reduction of the area when near the top, amounting to one-third less than the area of the flue beneath, others require the flue to be enlarged in the same proportion. But experience proves that a uniformity of area is the best.

The Franklin stove, much in use fifty years ago, was an open fire-place altogether of iron, having behind a warm air chamber supplied from the outer atmosphere; the warm air entered the room by the side of the fire-place, through several small openings or flues, of perhaps two (2) inches in diameter each. The effect was to check the draught through the crevices of the windows and doors, and thus obviate the great objection to an open fire.

In such a fire, there must be a supply of air to replace that which ascends the

flue, and the draught can be checked at the window, by admitting it through an open door communicating with the hall, or by a flue near the fire-place. Air admitted, as in Dr. Franklin's stove, affords a supply both for respiration and for combustion of fuel, between the fire-place and the person sitting near it, and thus does not pass over and chill him.

The great objections made to a wood fire on the hearth are; 1st, that of exposing the occupants of the room to cold draughts from the windows and doors; and 2d, the waste of heat, by the escape of hot air up the smoke flue. The first, as we have shown, may be obviated; and the second objection is applicable as well also to the use of hot air as supplied by our ordinary furnaces; for it is clear, that every cubic foot of hot air which enters a room from one of these heaters, must expel an equal quantity of warm air, otherwise it could not enter. From this arises a loss of heat, perhaps quite equal to that which passes up the flue of an open hearth. But whether with a stove, a heater, or an open fire, if we exclude fresh air we will have either a pestilential or smoky atmosphere.

FRANKLIN.

There is no one subject in the wide range of the building art, which has claimed more attention than that of the construction of chimnies and chimney flues. The principle involved is one that has led in past days to great controversy. Ignorance has done much to render the subject a source of annoyance; but the vast improvements made in all branches of science, as well as the wide spread information among artisans, gives us now a control of this problem which did not hitherto exist. Our valued contributor adds interest to the subject, both practical and philosophical, and the essay he has here given us, shows him to be thoroughly acquainted with the principles on which chimnies and chimney flues are best constructed. He has evidently given it much attention.

THE LABOR QUESTION.

IN attempting to elucidate the great labor problem, I am fully aware of the antagonistic opinions and theories of political economists, that must be set aside entirely or else be combated. Most writers and theorists of this day, take their stand-point ten or twenty years back, and conclude, because certain results had previously followed certain acts, that like results must inevitably follow the same character of acts at the present time. This is the great error of the day. Most men do not have an independent opinion, but rely on what they read for information of things that are past, and on the opinions of writers for the newspapers for the present. When the wise men of Italy and Spain contended with Copernicus that the earth was flat, and by sailing direct to any point of the compass, a vessel would be precipitated over the *edge*, they were as wise in their day as are the followers of Galileo at the present time. Progress in science and knowledge is continually demonstrating the errors of *positive facts*, as they had been believed, and I am safe in asserting that no opinion of any great savant, on account of his great reputation for learning, is entitled to credence unless such opinion is *corroborated by common sense*, as laid down by a man of comprehensive mind; one who is not influenced by prejudice, and who is capable of emanating more than one idea at a time. The world is too much given to being led by those who claim to have talent; and whether that talent was idiosyncratic, or comprehensive in its conclusions is not the question. As I have said before, men who were considered most talented in their day have been proved ignorant by the next generation. We have in this city some apt illustrations of this—the celebrated savant, D. Lardner, declared that it was scientifically impossible for a steamer to

cross the Atlantic, when the Siring, without his knowing it, had just arrived in New York harbor. Also, a celebrated and classically educated lawyer of this city, published an opinion that if gas was introduced in this city, for illumination, explosion would follow, and the city be blown up! The assembled wisdom of the whole country, in the United States Senate, ridiculed Professor Morse, when he asked for aid to establish the magnetic telegraph; and these men were *wise in their day*, but as the newspapers had not told them anything about the telegraph, and they had not read about it in the books, they followed the lead of the "*bell-wether*" of the flock, and ridiculed what they could not comprehend. Benjamin Franklin, one of the apostles of political economy, was *wise in his day*; but, let any man of a comprehensive mind take his Poor Richard's Almanac, and analyze his maxims, and he will prove to have been a rank demagogue, who never had an idea above *saving money*. His precepts and maxims were intended only to benefit misers, and men of grovelling minds, who would consume nothing that could be avoided, and would save every penny as the "*pounds would take care of themselves*." If the principles of these maxims were in general practice, we would have no more great enterprises like the Pennsylvania Central, the Pacific, and other great railroads; as men would be afraid to invest money in such speculations for fear they would "*pay too much for their whistle*," and in bringing "*their wants within their means*," they would destroy the possibility of any one making a living of those wants.

There is one maxim of the present day that is worth more to society than all the economical maxims that were ever written. "*The extravagance of the rich is the bread of the poor*." Dependent, as the

laborer is, on the man of wealth for the employment that enables him to provide for his family, he now, at this late day, begins to understand that money is as much dependent on him as he is on money. The two handmaidens of prosperity, labor and money, should walk harmoniously side by side, evading all antagonistic organizations.

As machinery becomes more perfect in its construction, and the necessities and luxuries of life are produced much cheaper, there must necessarily be less demand for the work of hands. For instance, suppose that machinery becomes so perfect that everything required of manufacturers, by man, can be produced by it, there would be nothing left for labor to do but to put the machinery together. Does any one suppose that man would be out of employment because there was not enough for all at full days work? What would be the result if, by machinery, the manufacturers of the world could be increased tenfold without extra cost over our present price of production?

In our time we have seen such an increase, by the substitution of machinery for hand labor.

Would nine-tenths of the working classes be idle, and be reduced to worse than poverty? or, would human wisdom and humanity see the necessity of allowing all to earn a living by an equitable division of the amount of labor to be performed, and regulate the number of hours to constitute a day's work, according to the amount of labor to be done and the number of hands to do it.

This is what we are coming to; on the surface of the question we see Trades Unions of workmen for their own protection; and counter unions among the employers against the workmen; thus making an antagonism between the employer and the employees; affording demagogues the fruitful opportunity of advocating that most pernicious of all isms *agrarianism*; arraying the poor against the rich, the many against the

few, and ultimately producing anarchy, where all would otherwise be happiness and prosperity if proper consideration for mutual interests were to animate both parties. There is no passion of man so baneful in its influence as that of envy. It is so engrafted in human nature that its eradication is impossible, and knowing this, we should endeavor to so mollify this passion by conciliation and kindness, that its effect should only stimulate each one to extra exertion to excel in his profession or occupation. Although we see the trade organizations, and clashing of interests, which on the surface seem to threaten the interests of both parties, "there is a power behind the throne which is greater than the throne itself," which is working out the great economy of Divine Providence, and which, without the aid of special legislation, will so regulate the affairs of the world, that man can be benefited or injured in the fulfillment of these immutable laws; injured by antagonistic opposition or benefited by assisting harmoniously in their operation.

"*The extravagance of the rich is the bread of the poor*;" and the economy of Divine Providence always did and always will demonstrate the truth of this. A surplus of labor is provided against in many ways. The economy of Divine Providence in ancient times provided work for surplus labor, in the erection of the great wall in China; the building of the pyramids in Egypt; the excavating of those grand mausoleums which were provided for the ancient kings; the erection of those grand temples at Ninevah, Carnac, and at Rome. In fact, the world is full of these monuments of *human labor*. Not only was this surplus labor employed in those grand architectural structures, but in matters of personal ornament, in furniture, in sculpture, and even in providing the materials for those grand banquets and festivities, in which the ancient world so prodigally indulged. Did any ancient philosopher warn them in that day to "save the

pence as the pounds would take care of themselves?" If he did, they paid but little heed to his teachings, and it is well for posterity that such is the case, as we would have been deprived of the great chart of science in all its various departments as laid down by the ancient world, and from which copies have been so copiously made in all succeeding ages. It is the fiat of the great Jehovah, that man should earn his bread by the sweat of his brow, and having promulgated this edict he will see that the work is provided. In the present day, flippant writers say much about the extravagance of the times. A candid comparison of what is called extravagance in the present day, with the apparently unnecessary indulgence of the past ages, would incline us to think that the world had been, for the last two centuries suffering under a chronic application of Franklin's maxims. We are in fact just emerging from a long period of close economy. But few monuments of the two past centuries exist as evidence of extravagance. Some few men of wealth and some corporations have built what are called grand buildings. The United States Government has erected a handsome Capitol and other public buildings; but there is ten times as much labor invested in St. Peter's Cathedral, at Rome, as there is in all the public buildings in Washington. It may with some truth be said that this is the age of utility, and that the labor of the world is employed in erecting things of benefit instead of those of ornament. We are digging canals, building railroads and steamships, laying ocean cables, etc. This is all very true, but we must not forget that even with the aid of the increased population of the world, we have expended less labor on all our railroads, steamships, canals and ocean cables, than was expended in building the great wall in China.

Again, in ancient times a national debt was not known, and if the subjects were taxed heavily by their rulers for the

purposes of war, or for the erection of those stupendous monuments of art and human labor, the taxes ended with the accomplishment of the object, and the people would soon recuperate their wealth for other purposes. They had no great amount of interest to earn, to pay for the waste or stealings of a previous generation. See the contrast. Then the taxes, although burdensome, returned again directly to the people in the shape of employment for their artisans, and the result was as we have mentioned before, the erection of those great records of the past. Now we have a great portion of our workmen, nearly one-half employed in earning interest. When we speak of interest we must not be blinded by the great amount so that we cannot see the smaller. In our country we have the National Debt, the different State debts, the city debt, corporation municipal debts, county debts, water supply debt, gas supply debt, banking capital debt, and on top of all these, every railroad and canal is borrowing all the money can be got upon their bonds, and the interest on all these must be paid by the labor of the workmen of the country, independent of what is required by taxation to support the multifarious parts of our government. As there is no wealth in the world that has not been produced by labor, the natural result is that the laboring classes must pay by their earnings all taxation, and all interest on all investments, either as bonded, national, state, municipal and corporation debt, together with the rents of all real estate, and the interest on the encumbrances thereon. If the labor of the world was to be employed in producing the necessities of life alone, we with the aid of machinery would overburden the market; the supply would be greater than the demand, and the consequence, ruinous competition both to the employers and employees, of which we have had painful experience the last two years. Notwithstanding the immense waste of the product of labor during the period

of war, from 1861 to 1866, we overproduced during that time, and have been doing so ever since. Overproduction has led to the establishment of Trades' Unions, as the workmen think for their protection, and the arbitrary regulations of these Unions have engendered a spirit of hostility against their members on the part of employers, thus keeping up a constant excitement. The workmen seizing every opportunity, with or without sufficient cause to strike for advances, and the employers watching their opportunity to reduce wages. What are called habits of extravagance on the part of the workmen, are more than balanced (allowing for the difference in position) by the indulgences of those who do no labor. What if the workman does indulge in his lager beer and pipe; do not the wealthy indulge in Champagne wine, and Havana cigars, and is not each one to be the judge alone of the character of his enjoyment; and has either party the right to dictate to the other what they shall eat, drink or wear? Habits of indulgence are easily contracted, but rarely or never abandoned. I think that all men of family will agree with me, that a workman who receives at the present time fifteen dollars per week, and who has a family of three or four children to support, has not much margin to work on for extravagance.

Twenty years ago a clerkship in the Post Office, or in a bank, at \$600 a year, was considered a great catch for a man of family, and with that amount of salary, he could live in a good house and supply all the moderate wants of his family, and save money for a rainy day. At that time a good mechanic could earn ten dollars per week. Now these same clerkships pay \$1,000 to \$1,500, and the mechanics' advance in wages is not more than to fifteen dollars per week. In the face of this fact, and seeing the advance in most all matters that produce income without labor, we hear continually, ding-dong in the master mechanics'

ears—you are paying too much wages; your goods are too dear; you must reduce the pay of your workmen, when we know that they are starving on the wages they receive. We have passed laws against violation of the Sabbath, but have neglected to provide against a prolific cause of this violation. Go down on the shores of the Delaware, or Schuylkill, or down the Neck, on Sundays, and you will there find thousands of workmen, fishing, gunning, and sailing, who would much prefer to have remained in the city, and to have attended church in the morning, and to have walked with their wives and children in our "*Elegant Park*" in the afternoon, but their pride forbid it. They have no clothes except their week-day working suit, and are ashamed to be seen at church or about the city and park. It takes every cent they can earn to keep the "*wolf from the door*," and sustain in food themselves and families. This is no fiction, as I write only what I know to be the truth. When bad legislation, national difficulties, or dullness of trade produces commercial distress, is there no one but the workman to bear the blame? Must he be the scape-goat for the sins of the whole community? The first cry of the unthinking in these times is the high wages. They forget that all the necessities of life are very high, with very few exceptions; and that bread and butter, good meat, and coffee, are necessary to the workman, who has his appetite sharpened by manual labor. He is willing to obey the Almighty's behest, "*to earn his bread by the sweat of his brow*." He only wants his bread after he has earned it.

It cannot be, where a christian community properly understands this, that a portion of them would want to indulge in all the good things of this life at the expense of the misery of others. I fear we are treading on dangerous ground, and fostering a feeling of jealousy that will produce bitter fruit. Put yourself for an instant in the place of an

honest well intending workman, who is out of employment, and necessarily out of money, and who has vainly hunted for work. He returns desponding to his home, and is told by his wife that the landlord's agent has been at his home during his absence, and threatened if the rent was not paid the next day, that they would be turned into the street without any shelter. To prevent thinking he takes up a newspaper, and the first item that strikes his eye is that Mr. S. has an income of five millions of dollars a year. Does it not require great moral courage and good religious training, to prevent him from calling the justice of Almighty God into question?

We are now approaching the most critical period of our National existence. The labor of the country is organizing for political purposes, and being nine-tenths of the voters they will accomplish their purpose to obtain political power, and when that time comes, will our republican institutions be strong enough to withstand the strain, or will we for a time relapse into an anarchial state like France, when she was revolutionized by Jacobin demagogues. It will not do for men of sense to ridicule the political agitation of the working classes. It will succeed in its purpose; but what will be the result of this antagonism of capital, and the power of numbers no one can foresee. However, it is fraught with sufficient danger to enlist the best talent of our statesmen in directing it to a beneficial issue; otherwise, demagogues will guide the movement and agrarianism will be the prominent principle.

Can any one give an intelligent reason, based on common sense or principle, why the price of wages should be reduced? Is it necessary, if we want to bring down the price of living, that our workmen shall be so reduced in their pay that they cannot buy the necessaries of life, and that the accumulation of food that they had earned, and which they should consume, but from poverty cannot,

should become a dreg in the market and fall in price because the poor are starving and cannot earn the money to purchase it? This is cruel and unchristian, but this seems to be the only means by which the price of living is to be reduced. Then why not let wages remain as they are, and let other things accommodate themselves to the price of wages? Men of limited or fixed income, may find it quite difficult to "*cut their garment to suit their cloth*" at the present time, but we will find the next generation will exert themselves to procure sufficient cloth for their wants.

In conclusion I will assert, and I am sure almost all employers will support me in it, that the workmen of the country have nothing saved, and that they depend on the Saturday's wages for the Sunday dinner, and the loss of employment for one week only, would plunge most operative families into distress. "*The extravagance of the rich is the bread of the poor,*" and the man of wealth who spends his income liberally (instead of saving what he can off this year's income to reinvest the next year,) will do more to fulfill the commandments, and benefit his fellow creatures, than the whole country can by building almshouses.

Give a fair day's wages for a fair day's work. Make the working classes contented and they will be the less disposed to vent their discontent in injurious trade organizations. We may as well at once dismiss all ideas of the price of wages ever coming down to what they were ten years ago. The immensely increased production of the precious metals has reduced their intrinsic value, and gold will not now, nor at any future time purchase the amount of labor that it formerly did. The wages of workmen have advanced in gold value throughout the world, and the same causes that have brought about the gradual increase of the price of labor, during the past two centuries are still at work. The interests of labor comprise nine-tenths of the interests of the whole world, and it will

be a much wiser and more humane course, to let other things regulate themselves to the present price of labor, than to attempt to regulate labor to suit them. Our working people within the last twenty-five years have been much more educated than they were formerly. Education produces refinement, and when a people become refined, what was formerly considered a luxury, becomes by education a necessity. Queen Elizabeth's best palace had the floors strewn with rushes, from the fact that they did not know at that time of the luxury of carpets.

In this age the poorest laborers cottage

has a carpet on the floor, as a matter of comfort and necessity. Does any one suppose that we will retrograde, and again strew our floors with rushes? The laboring portion of mankind being so much more numerous and powerful when organized than all other classes combined, it certainly seems most prudent and safe to have them satisfied with their lot, rather than aggravated and envious from destitution. It is much better to have the rivers to run into the sea, than to have the sea run into the rivers and overwhelm us.

GEO. H. HENKELS.

THE VITALITY OF REAL ESTATE.

EVERY person in a community is not directly interested in the rise or fall of real estate. All may be so collaterally, but it is owners and tenants only who have the direct interest. The general peculiarity of real estate is that it is slow of movement, a house or a farm cannot be sold as readily as a horse or cow. Put up a house at auction, and it is often found that not a single bidder is present. Advertise a horse, and the bidders will be many. The horse is at all times a speculative property, and may be readily removed from place to place, at a small expense, until a purchaser has been found. But not so with the house, which is a fixture, a reality, and must be sold where it stands.

It is true that real estate is often made the subject of gigantic speculations. All the great western railroads had their origin in the buying or gratuitously obtaining government lands, opening them up to settlement by building roads, and selling them at speculative prices. The great Pacific railroads are all of this description. The pioneer land grant to the Illinois Central was a memorable illustration of the magnitude of a real estate speculation, and of how far-reaching it sometimes becomes. Not only did the company derive enormous

profit from the increased value of the land they opened to settlement, but collateral gains were realised by a swarm of humbler speculators who quickly located themselves along the line of improvement. The charter of that company required the building of a station at every seven miles along the entire route. Each station was sure to become a town; some of them are already populous cities. It was seen that land would rise in value as population came in, hence the speculators were on the ground long before the track was finished. They bought by the whole or quarter section, and retailed out their acres in town lots. Hundreds in this way became rich, because wherever population is constantly increasing, there land is constantly changing hands. In such locations its sluggishness disappears. No fact is better established, than that it is population that gives value to land. The line of this great prairie road is now a perfect business hive.

In the early history of many great western cities there were curious facts touching their speculative origin. When Chicago was laid out, lots were given away to whoever would build. In Milwaukee and twenty other now prominent cities, the same attractive liberality prevailed. The projectors laid out streets,

and gave lots for churches, cemeteries, schools, and public buildings. But they had their reward in the increasing population giving value to their remaining land. Without such gifts their cities would have been of much slower growth. These successes in the west have been so remarkable since railroads were first introduced, that speculation in real estate became a constitutional mania. Towns were laid out where none were needed, and paper plans became text books in the hands of hundreds of speculators. Their business was not to build up a town, but to sell lots. Some of them succeeded in deceiving buyers, but others deceived only themselves.

Now, even these thrifty western cities have suffered in the value of their real estate in periods of general business depression, such as now rests on our country. At times, such as in 1840 and in 1857, real estate became absolutely stagnant. But it was equally dull in the great eastern cities. Philadelphia had its full share of this stagnation. Houses ceased to sell for cash, and bartering became the rule. Rents sunk to extremely low figures, and tenants were men worth cultivating. The only successful salesmen were the sheriffs, the only busy lawyers were those expert at foreclosure. But time vindicated the inherent value there is in real estate by bringing it back, all over the nation, not only to old prices, but in sending it up to double and quadruple figures. Speculation was only hybernating, not dead.

Coming nearer home, some similar facts may be observed. Almost everywhere within the atmosphere of Philadelphia, real estate has been made enormously active. Town after town has been founded and built up from the swarms annually thrown off by this great human hive. New Jersey has been a favorite ground for these enterprises. It is curious to observe that as they hug the railroads they almost invariably succeed. Florence, a mile from the station, was a total failure. Beverly, having the

track in its center, and numerous steamboats, has proved a great success. Riverton, having similar facilities, has also succeeded. Vineland, though depending exclusively on inadequate railroad transit, has grown up beyond all example in this portion of the Union. Where, eight years ago, there was nothing but the charcoal burner's hut, there are thousands of substantial buildings, and a superior population of ten thousand persons.

All these enterprises, with perhaps a dozen others that might be named, were speculations—that is, their projectors bought land at a low price, and infused into sluggish acres such activity as enabled them to sell it at a paying figure. This was probably all they contemplated doing. But in doing so, they have enabled thousands of families in over-at a moderate price, and others, in bleaker crowded cities to secure a country home eastern climates, to find locations more congenial to shattered health. It is not uncommon to hear speculation denounced and condemned. But all business is speculation. It is seen that real estate can be so conducted as to confer the greatest benefits on families who, in its absence, would find it impossible to accommodate themselves. The operator in real estate is as fairly entitled to the profit of his skill and capital as the merchant or banker.

New York and Philadelphia have been the scene of extensive operations in real estate within the last few years. In the neighborhood of both these cities, farms without number have been purchased by speculators and divided up into lots, which have been sold to another class of buyers, also speculators. These in turn have sold to others who thought they saw in them an advance. Thousands of such lots were sold last year in New York, at high figures, and were bought for a rise. But the pricking of the gold bubble in September took the starch clean out of many of these speculations. There, undoubtedly, the price of gold affected the

real estate speculation, for it was noticed that as gold went down, so did vacant lots. In Philadelphia the speculation not having been so active, the reaction has been light. But the inherent vitality of real estate, even under decided reverses, is shown in the continued building, in both cities, of thousands of new houses. Owners, in fact, have undiminished confidence. They know that real estate, though sometimes slow, is nevertheless sure to come back to and go beyond its former value. Reaction from the present dullness is

inevitable, and only a question of time. Fortunes have been made by simply holding on. Others have been lost by letting go too soon. The old wealthy families in all our large cities acquired their fortunes by the rise in real estate. No monetary panic gave them alarm. Their sole study was to hold on to what they already had, and to become the owners of more. This deliberation now will be found the wisest course. Two years will work a great change, from dullness to activity. E. M.

Burlington, April 30, 1870.

VENTILATION.

THE necessity for ventilation in this country is of but comparatively recent discovery, and has been met with so much ridicule and prejudice, that the subject has but lately commanded any attention whatever.

Our ancestors, in founding these colonies, were satisfied with rude houses built of logs and warmed by huge wood fires, which produced sufficient warmth and at the same time accomplished thorough ventilation, the chimney removing whatever impurities might be generated, and the cracks or crevices about the rooms, supplying the external air in all its purity for inhalation and respiration; but, wealth and a desire for luxury and refinement suggested more perfect joiner's work; and the stove and heater makers closed the open chimnies, and stopped up all the cracks and crevices, to prevent any escape of heat or the inflow of any pure air from without.

The human organism, it is well known requires every minute a large quantity of pure air for respiration; and the exhalation from the body and lungs is known to be a poisonous gas, proving fatal to health and sometimes to life; to remove this contaminator of air from close rooms, concert halls, and other places where persons are congregated, and to introduce other, or pure air warmed

in winter, and cooled, or in its natural state in summer, without producing unpleasant draughts and currents, is what we conceive to be the meaning of modern ventilation. The many appliances and mechanical devices to accomplish this object are so partial, and the successes so doubtful, that we pronounce them nearly all failures; the importance of this subject should certainly justify architects in allowing more space in their constructions, for ejecting flues and fresh air ducts. Owners and proprietors will be compelled, by the wants of the public, to pay for the means of proper ventilation in lecture rooms, and halls, where large concourses of people assemble; and private citizens should be educated to the importance of giving to their wives and tender off-spring, good pure air to live in, as well as fine clothing, well cooked food, and other luxuries, which are all secondary to a pure healthful atmosphere.

Many would dislike to apply to their lips a goblet that other lips have been in contact with, but do not consider that when in close rooms or crowded audiences, that they are inhaling the fetid and foul air from thousands of diseased lungs, and the exhalations from persons of doubtful cleanliness. We contend that it is possible to remove without

force, but by natural means the impurities spoken of, and maintain in cold weather throughout all apartments, a temperature equal to external air in the

mouth of May, without engines, power fans, or any such complicated machinery.

B. M. FELTWELL.

PALMER'S METALLIC PLANE.

THIS is an invention which arises out of the fact that wood is now being fast superseded by iron or steel. The practice of ages has been to make the stock of the plane of hard wood; and notwithstanding the unreliability of that material, its aptitude to spring out of shape, and to wear out soon, it has still held its place in the mechanic's

ment of an iron stock, in fact an iron plane of the same weight as the average of wooden planes. The throat is adjustable, and can, in an instant, be made very fine or very coarse, being always perfectly reliable.

The Bit is set for the work to be done, by simply moving the Lever A (see cut,) to the right or left. It is not loosened by the movement.

The Bit is squared, with the face of the plane, by the same movement of the Lever B. Both these movements are instantly and easily made by the fingers, while the plane rests upon the work.

This metallic plane is fluted or grooved on the face to overcome the adherence to the stuff, and at the same time to ensure exactness in the working.

The knob D, as also the handle, are of wood. The former answers the purposes both of a guide and an adjuster for the throat.

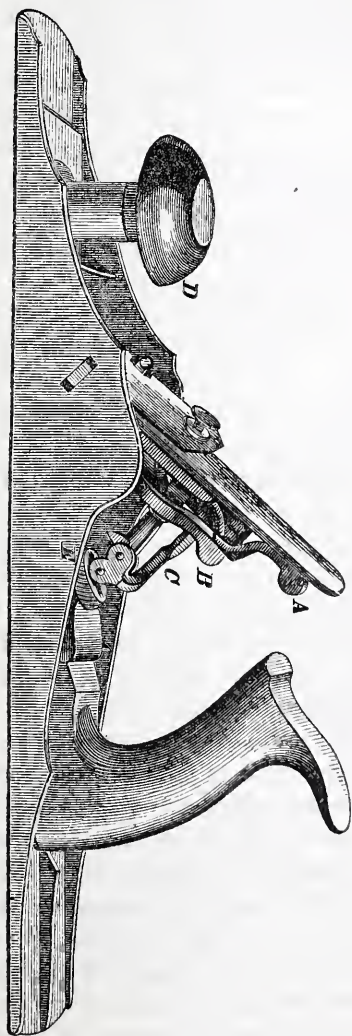
This tool is in fact a combination of smoothing, jack and fore plane, as well as jointer. It is also a block plane, and can be converted almost immediately into any of these.

We have taken the opinion of some of the best practical mechanics in the United States on the merits of this plane, and find that they all agree with us in thinking it a most admirable improvement, and one for the introduction of which workmen should be thankful.

The following is a reference to the mode of using it: To take out the Bit—Unlock the Toggle-Joint C.

To regulate the cut—Push Lever A to the right or left.

To adjust the Toggle-Joint to bits varying in thickness—Raise or lower screw E at its base.



tool chest. The illustration here represented gives us the long wanted improve-

HOUSEHOLD ECONOMY.

HIRZEL'S GERMAN GAS APPARATUS.

THERE is not a greater comfort in domestic life than that which gas bestows. Cleanly, neat, and always ready at command, it has no rival as a most reliable household servant. In cities it is easily attainable, but in the country an independent apparatus is necessary. And even where ordinary gas-works are already established in towns, a private apparatus for hotels, theatres, factories, and public and private buildings generally, is not the less desirable.

There have been many inventions to meet the want of such an apparatus as would combine reliability, inodorousness, and economy. Some of these requisites have been secured, but all three have failed to unite in the one apparatus until that of which we now speak, and which we illustrate on the next page, was introduced into this country from Germany, by Austin & Co., of New York. The works are not weak or ill contrived, but permanent and thoroughly scientific, the well studied invention of Dr. H. Hirzel, Professor of Chemistry at the University of Leipzig.

The process is as follows: Make a good fire under the retort, of coal, wood, or coke. Fill the cistern (see in middle of cut) with residuum. Wind up the regulator (see on the extreme right); this connects by the cord and pulleys, with the piston-rod of the pump, which, as the piston ascends, sucks itself full of (residuum) oil.

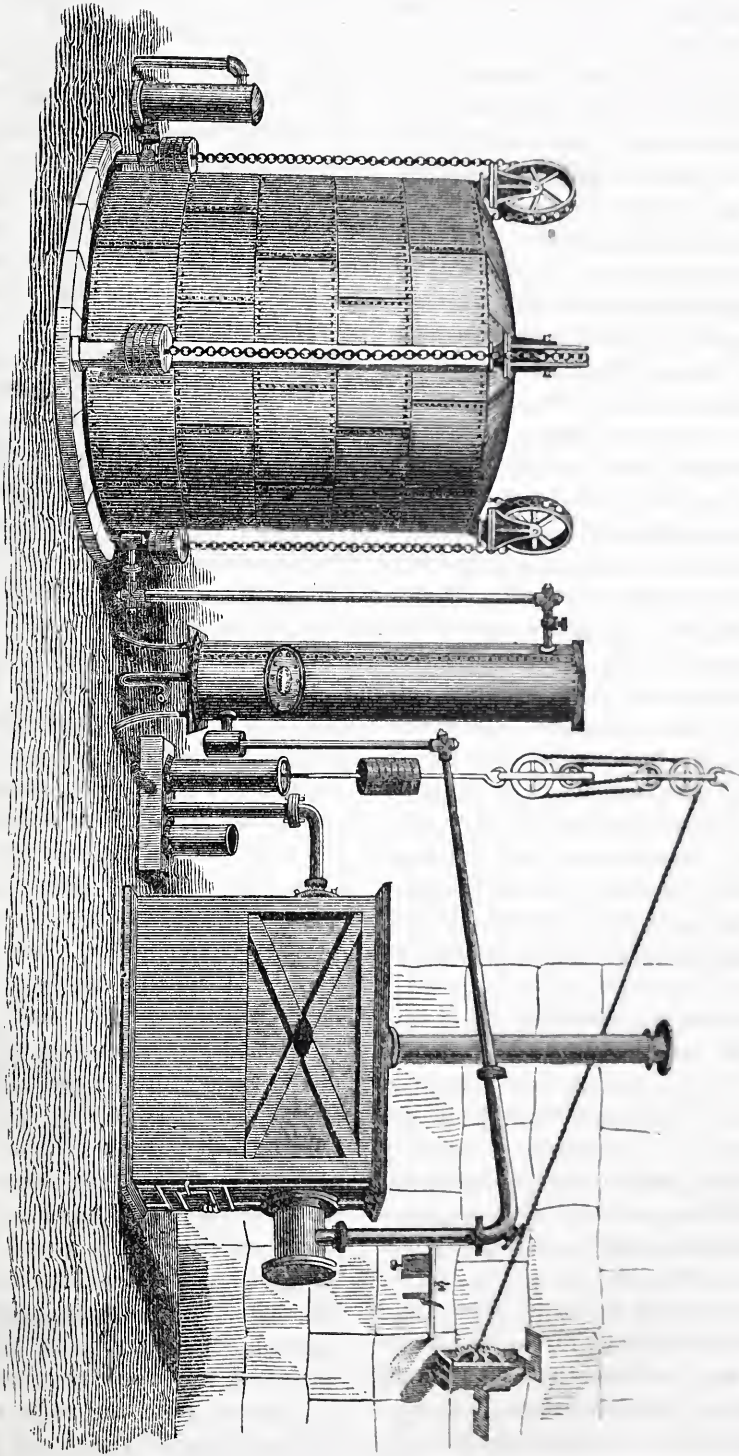
When the retort is heated to a good cherry red, set the clock work of the regulator free, which allows the weighted piston of the pump to descend, forcing the oil in a fine continuous stream into the retort, where it is immediately converted into gas, which then passes through the condensing pipes and purifier into the gas-holder ready for burn-

ing. This arrangement of feeding the oil does so with the utmost regularity, which is highly essential, and has hitherto been unattained; it saves much trouble and attention, gets the right quantity of gas out of the oil, and makes the retort last much longer.

While the regulator is in operation, a small gong attached to it strikes at intervals; this can be heard about two hundred feet off so that the attendant is not confined closely to the gas-house; should this cease to strike, it shows that the pump has stopped, and that no gas is being made; it therefore should be set going, and if run down, wound up again, when the operation goes on as before. One pump-full is emptied in about half an hour. The fire must be attended to from time to time.

In gas works for towns and cities, fire clay retorts are more generally used than iron ones, because when of good material and well made, they last a long time, sometimes several years. However, they have to be kept red hot all the time, or they crack on cooling and become useless. This completely precludes their use in small works, and forces the use of cast-iron ones. These last a good while if not subjected to high heats. In making gas from coal they have to be heated much higher than for oil, consequently the expense connected with making gas from coal on this score alone, is considerably more than from oil; this when taken into account with the difference in size (for retorts to make coal gas, are about three times the size of those for oil, which would give the same yield of light), makes a large margin of saving in favor of oil gas, besides saving in trouble of changing from old to new; this with coal gas is a great deal owing to the great

HINZEL'S GERMAN APPARATUS FOR THE MANUFACTURE OF GAS FROM PETROLEUM RESIDUUM.

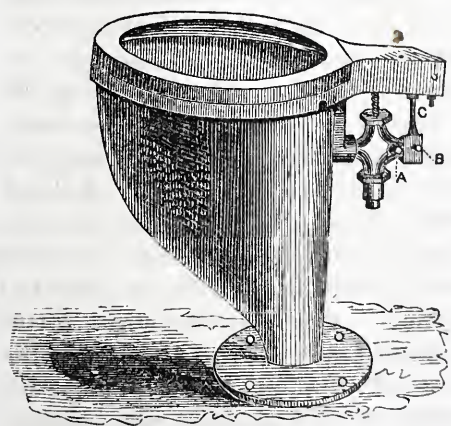


weight of coal gas retorts. The making of coal gas requires much more skill than for oil gas. However, the usual methods of doing so from oil are not free of trouble, and much attention is needed in feeding the oil; besides, in the summer, it is a very hot job, standing beside the feeding syphons watching that they keep running, and opening the cocks to clear obstructions. By Dr. Hirzel's patent feeding arrangement all this is obviated, as described in their circular; the attendant knows even at a distance if the oil is being fed into the retort, for if not, the bell or gong, on the regulator, ceases to strike. Dirt or lumps in the oil are of no consequence; they simply pass into the retort with the oil, because there is no straining of it through nearly closed cocks; it has a clear wide passage all the way. When retorts are fed by syphons and cocks, the quantity let in depends entirely on the judgment of the attendant. This being the case there is a strong incentive to run in too much oil, for in the making of gas there is a strong desire to get the gas-holder filled as quickly as possible; therefore, oil is often wasted by running in more than the right quantity suitable for the size of the retort; forcing is impossible without loss. True, when too much is run in, that is when the heat is right, much of it condenses and may be got mixed with tar or the tar drip. Indeed, there is little or no gas made when too much is run in during a proper heat, it (the oil) goes nearly all to vapor, and of course condenses. The attendant, as a rule, on seeing that the oil he is running in is not going into gas, but running in a condensed state out at the tar exit, pokes up the fire and makes a strong heat, for he thinks, at least, is apt to think, that the retort is too cold, and usually brings it up to a pitch far above what is right; the result being, that by a few such heatings the retort is destroyed. When gas is made in this manner (and it is a common occurrence), there is much of the

oil burned, so to speak, or subjected to too high a heat, thereby making much of its carbon or light giving material into lamp-black. Some of this is deposited in the pipes, and some of it keeps suspended or carried in fine particles in the gas. These particles gradually choke the gas pipes of the building lighted; especially are the pipes in the gas house clogged, and also the inlet and outlet pipes of the gas-holder; these getting clogged are very annoying and troublesome, inasmuch as the usual plan of inlet and outlet pipes, going up through the bottom of the gas-holder tank, makes it nearly a matter of impossibility to clean them. As our gas is always properly made, by reason of the automatic feeding arrangement (of course an attendant could make our retorts too hot also, if disposed, but not without its being shown at the test cock if he only takes care to look), we always have clean pipes. We have never yet had to clean our inlet and outlet pipes; but if cleaning was necessary, our arrangement of them is such that they can be unslipped, taken out and cleaned. No oil gas works but ours, we believe, have given complete satisfaction when burning the gas pure; therefore, as a general rule air mixing meters are used (we don't need them). These mix it with air as it goes to be burned, commonly 40 air and 60 gas, and sometimes half and half; it is then burned in common coal gas burners. These air mixers cost considerable, and give off an unsteady light, at least it shows pulsations; besides, the pipes with them require to be as large as for coal gas, and we believe they are not economical, but hurtful on this score. When small burners of the common style are used the light is smoky, as they are not suitable for rich oil gas, and from the holes being small they get (especially with gas made as we have described,) clogged with the particles of lamp-black held in suspense. Our burners as you will see, are specially made (in Germany) for oil gas, and as

our arrangement makes it pure and perfectly clean, and free from any particles of carbon that may be in suspence (there are always some in the best made gas), we get a most beautiful light. All this, combined with making all the pipes of the apparatus roomy, strong, and easy of access at every part to clean, besides all other parts being got up in a solid and substantial manner, and no need of a stream of cold water as some employ; we consider that we have such improved plans, that our works cannot be classed with the low and common arrangements in general use. One gallon of clean residuum, or as it is called, Paraffine Oil, costing 28 cents, yields about 70 feet of rich gas. This requires about 20 pounds of coal to make it into gas; at $\frac{1}{2}$ cent per pound, 10 cents; makes the cost of material for 70 cubic feet, or the equivalent of 350 feet of coal gas, stand about 40 cents, or at the rate of \$1.14 per thousand feet. Of course there is the attendant's time to add; also, the cost of a retort or two in a year, and interest on the money invested.

HOSPITAL WATER-CLOSET.



THERE is nothing around a hospital or asylum which claims perfection more than the water-closet. On it depends the sanitary condition of such institutions, and its ill-contrivance and consequent inutility goes far to impede

the best efforts of medical skill. How necessary is it then that this most useful appendage should be reliable past all doubt. Every effort made by scientific and mechanical skill towards the perfection so desirable, must ensure the attention of all who feel an interest in the speedy convalescence of suffering humanity.

Among the best of the recent inventions of water-closets, suitable by strength, easy action, and reliability for hospital purposes, the patent water-closet of Philbin & Eyauson, of which the above is an illustration; appears to meet all the requirements.

The hopper is heavy cast-iron, enamelled; the top frame is galvanized iron, with walnut top firmly screwed fast from bottom of frame.

This arrangement is specially designed for Public Buildings, or where strength, durability and simplicity of operation is required. The flow of water is regulated by turning (slightly) small cock (a) attached to the valve. The water does not run free until seat is relieved of pressure, when a copious supply is discharged, thoroughly cleansing hopper.

To take off seat knock out brass pin (b), slip off upright post (c), and lift the seat from the back part, until it becomes disengaged in front.

It is coming into general use and will no doubt establish itself on its own merits.

SHEET OF IRON.—There is now on exhibition in the Geological Museum of the General Land Office, a sheet of rolled iron three feet long and twelve inches wide, weighing but three and one-half ounces. It is thinner than ordinary writing paper, has a fine polished surface, is said to be equal to the best Russia sheet iron, and its evenness and texture is superior to anything of the kind ever produced in this country. It was manufactured by William F. Rogers, of Appollo, Pennsylvania.

ATHENS STONE.

HAVING given place in previous issues of this journal, to articles discussing the history, character, quality and quantity of the various building stones in use in our city and vicinity, we have deemed it but just and necessary, that we devote some space to the "Athens Stone," which is such a great favorite, and is so well known (by sight at least) to the most of our citizens. We are impelled to this from our desire to contribute all the reliable information we can get, in regard to a matter of so much importance as the material of which first class cities are built, and to the further fact, that our population increases so rapidly that the new comers, not directly interested in such matters, really know but little of any prominent material used in the erection of our first class structures. We also desire to give this information in regard to this particular stone, as it occupies such a prominent feature in the architectural landscape of our city, and has been so much admired by the crowds of strangers who yearly visit our city on business or pleasure. It is quite safe to say, that no city in this country, or any country, is possessed of a building stone that can at all rival our own, in having at our very doors such a splendid material. The admiration for this stone is as deserving as it is universal. It is as good as it looks. It has been tested by the most scientific experts in the service of the United States government, and has been accepted and adopted for use in the erection of the most important government works, its Custom Houses, Post Offices, Court Houses and Arsenals throughout the North-west. No other stone has received such unqualified endorsement as this "Athens Stone" at the hands of the government.

To this stone, its cheapness, the ease with which it can be wrought into the most elaborate architectural designs, more than to any other single cause, is

Chicago to-day indebted for her character and reputation, not only in the West, but in the East. The architects, who occupy the grand position of educators of a people, were not slow to appreciate the value of this material, without which it is safe to say, that in view of the great cost of transporting such heavy material, together with the cost of preparing it, not one hundredth part of the first-class buildings would have ornamented our splendid streets and avenues that do now. Without this material, the city must necessarily have been built of brick, with which little architectural character can be developed. With this splendid "Athens Stone" our enterprising citizens, directed by the educated mind of the progressive Architect, have been enabled, at comparative small cost, to erect structures that surpass in beauty of design and boldness of conception, those to be found in any other city in this land, always excepting the city of New York. There are more first-class structures on Lake street to-day—for the same length—than on Chestnut street, the pride of Philadelphia.

The quarries of this stone, from which is supplied nearly all the stone used in Chicago, are located in the town of Lemont, Cook County. *It is not the "Joliet Stone,"* at all, though many very intelligent people, including newspaper men, do speak of it as such. It is well known to men in the trade, that very little "Joliet Stone" comes to this market, that it is both in color and texture a much inferior stone, to the "Athens Stone." These Athens' quarries lie on both sides of the Illinois and Michigan Canal, about 25 miles from the city. The C. A. & St. L. R. R. runs across the most prominent of those worked, affording facilities for shipping, either in summer or winter.

The deposit of stone outcrops at or about a depression in the land, known

as the "Sag," about 18 or 20 miles from the city. From this point to where the best quality of stone is got is from four to six miles.

This stone is almost a perfect *Magnesian Limestone*. This term however, does not entirely indicate its true character, as there exists various stones known as *Magnesian Limestones*, both in this country and in England. Dr. Ure, in his Dictionary, describes at least a half dozen different kinds; but that one par-

ticular kind described by him, and which he declares to be one of the best building stones found in England, is identical in texture, color, hardness and friability, with the "Athens Stone;" indeed, the merest novice would recognize this at once, as the identical "*Magnesian Limestone*" of England, which is so much used there, and of which some of her most ancient Cathedrals, and her more modern Minsters, have been erected.—*Real Estate and Building Journal*.

THE RIGHTS OF ARCHITECTS.

WE deeply regret that the lateness of the reception of the following, prevented its obtaining a deservedly prominent place in this month's issue of the REVIEW. The action of these brethren is worthy of their standing in the profession; and we know that the independence which prompted this spirited rebuke, will ensure an echo of approval from every Architect throughout the land.

The Executive Committee of the Deaf and Dumb Institute of Maryland having advertised "To Architects" for plans, specifications and estimates, and also stated "while reserving the right to accept or reject, the Board will grant compensation only for such plan as may be adopted, the premium to be such as the Board in their discretion, may allow," the architects of Baltimore, in a body, addressed to the Board the following letter, which received an unfavorable answer, declining to accept any suggestions:

BALTIMORE, Md., April 26, 1870.

To the Executive Committee of the Maryland Deaf and Dumb Asylum, Frederick, Md.—GENTLEMEN: Regarding your advertisement for designs for a Maryland State work as specially addressed to Maryland architects, and representing, as an association of Baltimore Architects, a very large majority

of the profession in our State, we ask your kind attention to an explanation of the reasons why we do not feel inclined to comply with terms which, if they become customary, would render the practice of our profession impossible.

If any one thing is of paramount importance and weight in determining the value of a building, it must be its merit of plan and design, for when these really practical points are failures, no amount of mechanical excellence of construction can redeem the result from contempt.

The cultivation and intelligence of a great nation has no surer exponent in the eyes of cultivated men than the character of its public buildings—and in no country more than our own, do the inhabitants of cities, fortunate in this respect, insist upon their claim to pre-eminence over their less judicious neighbors.

For such reasons our art has, from the beginning of history, taken the first place among the arts of civilization, and at last begins to claim in our country some of that consideration which elsewhere has been acknowledged for three thousand years.

We are satisfied that you do not wish to force upon its professors here a system which can only cripple and degrade its practice, and which (as you will see

by the accompanying papers) has been condemned and rejected by all the principal architects of the other large cities.

We are aware that at present, popular prejudice favors your view, which we are sure arises from a misconception, not only of the duty and services of an Architect, but of the amount of labor and expense involved in the production of his work. It is generally supposed that an Architect is one who by some exercise of fancy, rather than of brain and hand work, produces in an off-hand manner "pretty pictures," which may be carried out, and with *improvements*, by any "builder." A more intimate knowledge of us and our work would show that a successful Architect must be one who is a laborious worker, collecting exhaustively, all the evidences of needs and uses for the building before his mind, and carefully evolving from that evidence and experience such a structure as shall prove the best, in point of plan and good construction, possible within the means of his employers. His taste, judgment, knowledge of materials, locality and climate must then enable him to arrange his results in such form as shall gratify the sense of beauty in the eyes of his own and future generations.

Well may we then ask—can any one so occupied render unpaid the services you call for? If all important buildings were to be worked for, as you desire us to do, each Architect would have to study and design *every* building of his time for the bare chance of being paid an uncertain amount for *one*.

In the case of your building, should twenty architects respond to the advertisement, they would supply "gratis" work of more actual cost to them than the amount of the entire commission usually charged by us for erecting an edifice of the value of that proposed by you.

Therefore we would respectfully suggest such a modification of your terms as will permit all respectable members

of the profession to comply with your wishes.

By reference to the "schedule of charges" of the "American Institute of Architects" enclosed, you will perceive that a charge of one (1) per cent. on the estimated value of the proposed building has been determined to be a fair and equitable compensation for "competition designs" or "preliminary studies." For your building this would amount to \$1,000, but as the actual cost to each competitor would not amount to that sum, we would propose to divide it into five parts of \$200 each, and the terms of the competition to be as follows, viz:

1st. The author of the most approved design to be employed to erect the building, at the usual professional rates.

2d. The authors of the five (5) next best designs to receive premiums of \$200 each.

By this means six (6) at least of the competitors would not lose the entire value of their labors, and the inducement to enter the list correspondingly increased. We would further propose that the board require all drawings to be made to the same scale, say one-eighth of an inch to one foot, so that a fair comparison can be made of their respective merits, and a more equitable conclusion arrived at.

Should you consent to the proposed arrangement, the reasonableness of which we feel sure you will admit on examination, will you be good enough to extend the time for sending in the drawings until the first of June, in order that full justice may be done to the subject.

We remain, with respect, your obedient servants,

J. CRAWFORD. NEILSON, for Niernsee & Neilson; E. G. Lind, N. H. Hutton, for Hutton & Murdoch, Thomas Dixon, J. Wilkinson, John W. Hogg, Charles E. Cassel, Frank E. Davis, Jackson C. Gott, Henry Brauns, R. Snowden Andrews, J. C. Wrenshall, John Ellicott, E. F. Baldwin, for Baldwin & Price, G. A. Frederick.



EDITORIAL ITEMS AND CORRESPONDENCE.

THE Architect of St. Mary's Church, New Haven, Conn., is Mr. Jas. Murphy, of Providence, R. I.

FROM Little Rock, Arkansas, "*An Enquirer*" is informed that Adams' Air Cylinder Graining Machine, can be obtained at No. 44 Murray street, N. Y.

THIS number of the REVIEW will complete the second volume. We have spared no pains or expense to make it of value to our readers, and we consequently feel that we can claim your assistance, and that you *will* aid us in extending the usefulness of our publication.

We hope to cultivate a more general appreciation of the high art we profess, and shall endeavor to make the REVIEW always worthy of patronage and commendation by our brothers of the profession and press.

Among the latter we are always cordially received, and for this we wish here to make a general acknowledgment of their many favors

THERE are three new theatres in process of construction in this city, all to be occupied this fall.

THE new building of the Equitable Life Insurance Company in New York, was thrown open to the public the latter part of last month. It is a noble structure; seen from the river its roof towers above all the surrounding buildings. There are two steam elevators for pas-

sengers, kept constantly running to give access to the upper stories.

WE would call attention to the patent Sidewalk Lights, manufactured by Brown Bros., of Chicago. They are an invaluable invention, and any of our readers who may have occasion to use anything of the kind, would do well to send for a catalogue. See advertisement.

EIGHT HOURS A DAY.—The following paper, signed by all the architectural draughtsmen in the city, was recently presented to their employers, in Cleveland:

In conformity to the custom of architects in other cities, we, the undersigned, architectural draughtsmen of Cleveland, hereby respectfully request that the architects of said city will reduce the time of working to eight hours per day, commencing at eight o'clock in the morning, and terminating at five o'clock in the afternoon.

To this communication the following reply was made:

We, the undersigned, architects of Cleveland, being of the opinion that eight hours time is sufficient for the performance of a day's work, and is all the time that a draughtsman should be confined to the office, and that more time allowed to our assistants for relaxation and study, would make them more efficient and profitable during the time actually engaged, do, therefore, cheerfully grant this request:

C. W. HEARD,	WALTER BLYTHE,
A. KOEHLER,	JOSEPH IRELAND,
GRIESE & WEILE,	MYER & HOLMES,
LEVI T. SCOFIELD,	L. P. ELDRIDGE,
CUDELL & RICHARDSON.	

The new arrangement goes into effect immediately without any corresponding change in salary.

MR. ZERAH COLBORN, the eminent author, and formerly editor of *Engineering*, a London publication, recently committed suicide in Massachusetts.

THE "Hotchkiss & Buss" Brick and Tile Machine has certainly many merits. Its compact nature and simplicity making it very desirable especially in cities where ground is valuable; and its small cost renders it available to country operators. Send to Mr. Thos. L. Cornell, Derby, Conn., for descriptive pamphlet, and note the numerous testimonials in its favor.

PERIODICALS.—*Littell's Living Age* comes to us regularly with its never failing supply of standard literature.

Tilton's Journal of Horticulture is decidedly the most elegant in typography of any publication we receive. It consists of 64 octavo pages, principally original matter, and consequently should be in the hands of all interested in the science of which it is an exponent, no matter how many other journals of the same class are read, there will always be something valuable to know in Tilton's.

THE *Watchmaker and Jeweller*, a most valuable publication has been enlarged. It contains matter of interest to every one of scientific tendencies, and is suitably and extensively illustrated. Published monthly by E. Albert & Co., 65 Nassau street, New York. \$2 per annum.

Newark, N. J., has a most excellent representative in *The Manufacturers Gazette*. It is well known that this place is the third manufacturing city in the States, and anything in this line will be authority with manufacturers everywhere. The subscription price is 50 cents per annum.

THE *American Sunday School Worker* is a new magazine for parents and teachers. It is published in St. Louis by J. W. McIntyre. Its typography is excellent; its articles unsectarian and able. The contents of this number are Child Conversion, Visible Illustration, Organization and Government of Sabbath Schools, Children must be born again, Family Department for Children,

Blackboard Lessons, Book Notices, Lessons with Questions and Expositions, Editorial, Poetry, etc. Price \$1.50.

The Bright Side is a publication for children which we can recommend. Send to Alden & True of Chicago, for sample copy.

A STILL FURTHER ADVANCE TO MECHANICAL KNOWLEDGE.—Mr. Robt. Ridell, who has already done much to elucidate the accurate science of stair building, is now preparing for the press a practical work entitled "*The New Elements of Hand Railing*." It is fully illustrated on forty plates, accompanied with clear and concise descriptions. It will be eleven by fourteen, on best paper and new type. Claxton, Ramsen & Heffelfinger, publishers.

THE project of uniting the Cooper Union School of Design for Women and Boys and the School of the National Academy of Design is in a fair way of being consummated. Last October the Trustees of the Cooper Union sent a note to the President of the Academy of Design, in which they offered to convey to the National Academy of Design the entire collection of valuable casts, etc., which the Cooper Union now possesses, and also would give a perpetual income of \$5,000 yearly, as a consideration, if the National Academy of Design would, in return, take upon itself the care and teaching of the pupils that now attend the Cooper Union School of Design for Women in the day and the Boy's School at night. This proposition the Trustees of the National Academy of Design last week decided to accept, and have informed the Cooper Union of their decision. This communication was signed by Messrs. Page, Guy and La Farge. It has been decided by the Trustees of the Cooper Union that the new plan will go into effect next October.

THE Jews of Troy, New York, are to build a new Synagogue, at a cost of \$16,000.



A RURAL RESIDENCE.

THE
ARCHITECTURAL REVIEW
AND
BUILDERS' JOURNAL.

OUR THIRD VOLUME.

THE very flattering success which the ARCHITECTURAL REVIEW has hitherto met with, emboldens us to hope that its progress will even increase upon its present rate; and to that end we now call upon all our readers to recommend it to their friends; and thus help realize our anticipations.

As an advertising medium the REVIEW is admirably calculated to reach the very class for whose notice many manufacturers and business men are anxious. It is now the recognized organ of the vast building community of this extensive country, and its circulation is so wide as to reach the most distant parts.

To secure the fullest patronage we are determined to make our pages more interesting and instructive than ever.

PRACTICAL ART EDUCATION.

THE popularizing of economic art principles should be a great incentive to every citizen who values the true object of national education, and who desires to render more comfortable the state of that great class of humanity whose means fall far short of their desires, and whose taste is ungratified, for the lack of that knowledge which often serves the place of money, and gives to the possessor the power of controlling wants which could not otherwise be met. The wealthier class of the community has the power of calling to its aid the talent and ability necessary to design and create; and the wants, or rather desires, which vanity and ambition may

urge, can be ministered to by that golden chart whose spell is omnipotent in this world.

It is therefore among the poorer class that the principles of economy are exclusively required to be disseminated; and, their wants being many, the effort to reduce them must be proportionately great.

Science has done much to enlarge the sphere of man's authority; science is no less able to encrease the comforts and add to the happiness of the laboring poor. It is not alone necessary that nations should be great, it is even more desirable that the people should be content; for, national greatness with popu-

lar wretchedness, is gilded rottenness. Now, to secure contentment to this great mass of human beings, is as necessary towards the establishment of a mighty nation as conquest, or the acquirement of wealth can possibly be; nor is there any form of government which can bestow this blessing by legislation which goes not into the primary requirements of the governed majority.

To make a man feel respectable you must educate him. This is the refining process. But, education may be made conducive to his misery, instead of his happiness, if it be not of that kind which enables him to gratify his natural taste by the exercise of that intelligence which his Maker so freely bestowed upon him.

While we wonder at and admire the mechanic genius which has produced some great invention to benefit the world, should we not at the same time feel that his uneducated mental struggle to give birth to this invention, reflected on that neglectful government which gave him not the means of more easily developing his plan? Who can say how many mental mines of useful thought perish unexplored among us for want of that confidence which knowledge gives, and without which genius is too apt to be a coward; for, modesty is the sure accompaniment of merit; and when uneducated, feels its nakedness and shrinks from observation. There is, it is true, in some men an innate energy which, prompted by ambition, displays itself in what is known as self-education; and we often see such arising in our midst, and growing far out of reach of the class they sprung from. But, these are exceptional cases which should not be allowed to exercise an influence against the education of the great many, who, possessing talent, either know it not, or keep it secret for want of that confidence which mental culture would so surely give them.

The "self-made man," as he is called, is invariably energetic in a high degree.

The man of talent is too frequently the reverse.

The business of education is to draw forth the latent powers which timidity withholds; and to *make* men, that would never be "self-made."

We have before advocated the introduction into our public schools of such studies as are best adapted to the wants of our future mechanics; and we still feel that it is our duty to urge this subject as one of paramount importance to the community at large; for, the mechanic stands in that relation to society in its most civilized condition, that it becomes the interest of all that such education should be freely provided for him before he enters on the actual business of learning his trade.

Were such a course adopted, how clear to the comprehension of the apprentice would be the first tasks which would be set him, and how much more profitable to his instructor would be the early efforts made by him. How easy and how advantageous to all would be this primary instruction.

Practical art education is something outside of mere school study, however; yet a something that is quite as requisite to the development of native talent, and to economize this study is simply to bring its teachings within the reach and means of all.

Mechanics' Institutes have all the elements of utility in this respect; and it is a thing to be deplored that they are so few and so inefficient in this country. We look in vain for their winter courses of lectures on popular science: We search in vain through their library shelves for those practically useful volumes which should take the place of the trashy love tales, and fashionable novels which are so run upon and so thumbed.

In fact, we have no fitting medium of instruction for our mechanics, and it is high time that the want should be supplied. Every school district ought to have a library and reading room fitted expressly to the wants of the great work-

ing class. Every city and every town should have a museum of art, and skilled professors be employed to instruct in drawing; and lecturers on practical philosophy be permanently engaged to give free lessons that will interest and im-

prove the working man. No merely ornamental education, or theoretical teaching. No abstruse learning, difficult of comprehension, or worthless to such an auditory, if understood. All plain, sound and practical.

PROFESSIONAL RIGHTS.

THE admirable stand which the architects of England are at present making in favor of Mr. Barry, as opposed to the contemptible efforts of a government authority to compel that gentleman to deliver up the voluminous drawings of his father, is worthy of the best sympathies and the warmest admiration of our brethren on this side of the Atlantic.

It is not unfrequently the case that our architects, especially those westward of the Atlantic cities, are expected to leave their drawings in the hands of the client after execution, or even more frequently in those of the builder, and that the possession of them is looked upon, by the latter at least, as a matter of right.

Some architects, and not a few, provide tracings on cloth from the originals, which they tacitly permit the builder to retain. This is altogether wrong; the drawings belong, by right, to the author of them, and when the building is executed, the purpose for which they have been prepared is accomplished, and they return to the architect, whose sole property they are.

Suppose, for the sake of argument, that the builder claims, as a right, the retention of the drawings committed to his care, then the question arises—can he make use of any part of those drawings in any other building of which their designer is not the architect; and, if not, to what purpose does he retain them?

Now, it is certain that the design is private property; the building after such

design is a matter of business, wherein the architect sells the right to so build it; but, does not thereby dispose of his exclusive right to the design itself; and consequently, the drawings of such design, as well as all tracings or copies of it made in his office, are his property.

It is right that this matter should be distinctly understood; and that the misunderstanding, on the part of either client or builder should be cleared up by the assertion of the evident title of the architect to the drawings, tracings and copies; unless by special agreement it is otherwise decided.

While on this subject, we cannot do better than draw attention to the efforts being made in London to establish the fact of this right, which will be seen in the following report in *The Builder* of the recent audience of the architects with the British Government:

“On the 13th instant a deputation from the Institute of Architects attended the Prime Minister in Downing street, touching the dismissal of Mr. Barry from the Houses of Parliament, the importance of properly qualified supervision of all important public buildings, and the ownership of architects' drawings. The deputation included Sir William Tite, M.P.; Mr. Beresford Hope, M.P.; Sir M. D. Wyatt, Professor Kerr, Professor Lewis, Mr. G. Aitchison, Mr. A. W. Blomfield, M.A.; Mr. D. Brandon, F.S.A.; Mr. F. P. Cockerell, Mr. H. Currey, Mr. R. W. Edis, F.R.S.; Mr. G. Godwin, F.S.A.; Mr. O. Hansard, Mr. C. F. Hayward, F.S.A.; Mr. E. P. Anson, Mr. E. Roberts, F.S.A.; Mr. J. P. St.

Aubyn, Mr. G. Truefitt, Mr. Sancton Wood, Mr. J. H. Hakewill, Mr. J. Peacock, Mr. R. L. Roumieu, M. T. R. Smith, Mr. W. White, Mr. F. Warren, Mr. J. P. Seddon, Hon. Secretary; and Mr. C. L. Eastlake, Assistant Secretary.

"The deputation was received by Mr. Gladstone, with whom were also the Chancellor of the Exchequer and the First Commissioner of Works.

"Sir W. Tite introduced the deputation and the subject. Sir Digby Wyatt, in place of his brother the president, who was unable to attend, stated forcibly some of the views of the Institute, and Mr. Beresford Hope, Mr. Godwin, and Mr. Seddon followed. We have not notes of what was said, and can only recall the observation of one of the speakers.

"He said he had been requested as an old Fellow of the Institute to add some words to what had been already urged: first as to the ownership of drawings. As a matter of universal custom, the drawings belong to the architect. As the conductor of a professional journal, he had corresponded during more than twenty years with persons in all parts of the kingdom on this subject, and he could say that in no one case of which he was aware had the claim, when made on the part of the employer, been maintained. He did not know that any case had been taken to a court of law; representation of the existence of the custom, and the common sense on which it was founded, had sufficed to bring about a settlement. The custom prevailed everywhere. He believed copies of resolutions to that effect from societies in England, Ireland, and Scotland, not to speak of America, had been already handed to the Minister. Should the question go to law, he thought the courts would hesitate before coming to any decision in opposition to a custom so long and generally acted on, even should they happen to be of another opinion. It had been asserted in a public journal that the Institute of

Architects had wrongly interfered in expressing their opinion that it was necessary for the worthy maintenance of national monuments and buildings, that they should be under the superintendence of specially educated men of high standing. He could not agree in this objection. The Institute, a chartered body, were disinterested in so speaking, the matter affected so few, and he knew no other association from whom the public might more fairly look for an expression of opinion and guidance on the subject. Reference had been made to various public buildings, each placed under the superintendence of an architect, such as St. Paul's, the Bank, and others. He would add to the list by naming nearly all our cathedrals. These important structures had suffered for years by being left to the care of a mason or a clerk of works; but the opinion of deans and chapters had become educated on the point, and now he believed there was not one cathedral that was not under the supervision of an architect. The profession were strongly affected by the course that had been pursued towards Mr. Edward Barry, and the important questions that were raised by it, and he ventured to urge that it called for reconsideration on the part of the Government.

"Mr. Ayrton replied at some length, and Mr. Gladstone also spoke; but their views, as expressed later in the day in the House of Commons when speaking on Mr. Cowper Temple's motion, have since been so widely published that it is unnecessary now to report them. The striking point in Mr. Ayrton's reply was the assertion that much of what had been said by the deputation was founded on misconception, as Mr. Barry had not been dismissed! Mr. Gladstone, in the course of the debate, said the same thing. What Mr. Temple did was to call attention 'to the correspondence relating to the dismissal of Mr. Edward Barry from his employment as Architect of the Houses of Parliament; and to move that, in the

opinion of this House, the abrupt discontinuance of the employment of the architect who has hitherto been engaged whenever professional skill and responsibility were required, at a moment when works entrusted to his direction were still in progress, is uncalled for and of doubtful expediency.'

Mr. Gladstone, as referred to, said:

"The words of the motion evidently implied that the completion of works in progress under his charge was to be taken out of his hands; but that was a statement which was entirely without foundation. Mr. Barry was to complete the works which were in progress exactly as he would have done if this correspondence had not taken place; and as to the future, the Chancellor of the Exchequer had given it as his opinion, that Mr. Barry ought to continue to be employed when works were required in that building. The employment of Mr. Barry as an architect neither had been discontinued with regard to works in progress,

nor had been declared to be about to be discontinued with regard to architectural works which might hereafter be declared necessary.

"We will say nothing of the terms of the correspondence on which the opinion out of doors was founded. On these statements being made in the House it would have been as well if the motion had been withdrawn. However, it was pressed to a division, and being twisted into a sort of 'want of confidence' motion, was, of course, lost, 109 voting for it, and 152 against, a small difference under the circumstances, especially as several members quite opposed to the proceedings of the First Commissioner,—for example, Lord Elcho, Mr. Alderman Lawrence, Sir James Lawrence, and others,—refrained from voting, considering it not desirable to press the Minister too hard.

"The claim to ownership of drawings still remains open, and to this we shall doubtless have to return."

ARCHITECTURE AS IT IS IN AMERICA.

IN one of those able and clear sighted leading articles with which the veteran editor, Professor GODWIN, conducts the *London Builder*, we find the present position of architecture in this country, taken up and reviewed under the caption of "American Professional Papers," in such a friendly, yet critical manner, that we cannot refrain from adverting to it.

The article commences with a sketch of the history of our Institute of Architects; and is as follows:

"Twelve years have now elapsed since the architectural profession in America gathered itself together, and founded an Institute of Architects. This raising of the standard has placed the profession upon a legitimate basis; not only bonding together and making it a tangible reliable fact before the public, but creating for it headquarters, an agreeable fellowship among its members, the pos-

sibility of action in unison, and pervading it with that subtle quality of cohesion, combination, and competition, known as *esprit de corps*. The last three years of the period in which the Institute has existed have been the most fruitful, whence we may assume that those to come will be still more so. The progress made is most recognisable in the fact of the inauguration of annual conventions of one or two days' duration, in which the president gives an address, the reports of the local chapters are read, and papers on various professional subjects are read and discussed. As would be observed in the *Builder* of the 23rd ult., the Institute has issued a schedule of charges, endorsing as a starting point the time-honored fee of five per cent. usual on this side of the Atlantic, and some of the details in common with the schedule of the British Institute. It has also pub-

lished the proceedings of the three conventions that have now been held, and the papers read on those occasions. But it is not by the work it has accomplished itself so much, as by that it has called forth in other directions that we must measure the amount of usefulness it has performed. Since these annual conventions have been arranged, a number of professional journals, altogether independent of the Institute and of each other, have appeared upon the face of American literature. Directly architecture came to the front, in a word, sympathizers and supporters appeared on her right hand and on her left; and we must look upon the position so assumed and thus ensured as one of great promise."

In noticing the published proceedings of the Institute, he says:

"They show us the great, busy, work-a-day America, with its tall warehouse-looking dwellings and tramway-laid streets of bold-faced, self-asserting stores, in every respect indicative of the fact that trade and traffic are the main considerations taken into account in their eager, daunting, pushing continuity; and they show us, too, that other America, bountiful as boundless, that had rest and release in it for troubled spirits in the days of the Stuarts, the Old Colony days, the land of Miles Standish and John Alden, that our forefathers spoke of as 'our plantations in America.' This last phase is most apparent in the paper read by the president of the Institute, Mr. Richard Upjohn, on 'The Colonial Architecture of New York and the New England States.' He tells us that only a few of the colonial buildings remain, but they are striking evidences of the taste and skill of the period to which they belong, and identical in style with cotemporary buildings in Holland and England. If the Institute should be able by its influence to preserve these interesting fabrics from demolition, it will be doing a good work. As pictures in the history of America, they are absolutely priceless; nevertheless, their number is

gradually getting smaller and smaller. In the face of the strong feeling there is in our own country in favor of the conservation of our ancient buildings, it is scarcely to be credited that this comparatively new country ruthlessly razes to the ground the architectural links that connect it with the Old World. Even some of the old churches of the early colonists have been destroyed; relics we should have deemed as precious as Saxon remains are in this country. Their ancient features, with their refinement of quaint simplicity, associated with so much that is worthy in the history of the sons of Japhet, have been considered as naught; as no more, in fine, than the rosemary odor, 'commingled with pansies,' 'the Puritan pansies,' that Edgar Allan Poe would have found lingering in them. The North Dutch Church, erected by the Dutch colonists in Fulton street, was destroyed last year; and the South Dutch Church, now used as a post-office, is doomed. Mr. Upjohn remarks that St. Paul's one of the most prominent landmarks in the city of New York, still stands in almost pristine vigor. We trust that it may long remain to do so, for a companion edifice, Old Trinity Church, has been already thrice rebuilt. All the domestic buildings of the primitive days of this city are either utterly lost or so defaced as to be of little interest; but Brooklyn is more fortunate in still retaining some of the picturesque homes built by the earnest, stout-hearted, faithful colonists. Mr. Upjohn records, and we are glad to pass on the word, that there is an old house in South Brooklyn, on Fifth avenue, near Greenwood Cemetery, with the date 1699, in wrought-iron figures forming the anchor heads, on the outside. He says: 'It is a brick building, built, as was usual at that time, of bricks brought from Holland, and laid up with mortar probably made of shell lime. It is remarkable that the gable walls of this house are without coping, but are finished with bricks standing angle-wise,

and forming the zigzag lines still seen on the gables of houses in Holland and Belgium; yet the mortar joints, exposed to the weather two hundred years, are still intact.' The period of this erection will be better realized if we remind our readers that it was only thirty years after Charles II., by the grace of God, King of England, Scotland, France, greeting, granted to his 'dear and entirely beloved cousin, Prince Rupert,' and others, the sole trade and commerce of Hudson Bay. Architecture and the art of building have not arrived at so much perfection in America that the loss of such an

example can be afforded; and we must add, again, the Institute will advance its interests by protecting from demolition the Old World homes that were transplanted with so much effort and care. Boston, Cambridge, Newport, and New London, Connecticut, also retain attractive examples of genuine domestic architecture, of which, Mr. Upjohn suggests, that the members of the academy of design should make careful studies, as they will be buried in oblivion in the course of another century; which prophecy all well-wishers of architecture in America will desire may not be fulfilled."

THE BLOCKLEY ALMSHOUSE.

IT is a very general error into which our cities are apt to fall, that of neglecting present opportunities which might be easily embraced, and prove very great benefits to future tax-payers.

The value of the real estate occupied by the Blockley Almshouse is very great, and the immediate sale of it urged by one of the city papers (*The Star*), as being most advisable. It proposes to leave the hospital department, but to remove the pauper and insane wards to the farm north of the city, on which the new House of Correction is to be built.

We consider the subject to be one of very great moment, and perfectly agree with *The Star*, in its view of the question as connected with the necessary enlargement of the insane department of the present structure.

Additions, alterations, and repairs, arising therefrom, must cost a considerable sum of money, and the buildings erected will by no means permanently suit either the wants of the city or the pockets of the tax-payers; for, as *The Star* truly remarks, "in the course of a very few years the removal of the Almshouse from its present site may be regarded as a fixed fact." Then, is it not unwise to think of building new additions on ground so valuable, and so

sure of an immediate purchase as is the present site, when the money which could be had for it would more than pay for permanent and all-sufficient buildings on the farm of the House of Correction already the property of the city.

The Blockley Almshouse is a crude collection of additions to old buildings, making up an appearance unworthy of the character of Philadelphia for architectural taste, which stands up in our very midst, bearing witness against us.

Whether viewed in a sanitary, an economic, or a tasteful light, the most prudent course to be adopted is that of the sale of the present site, and building *de novo* on the farm just such a structure as the future, rather than the present, calls for. The city grows at a rate that will demand a building of a size which in our present condition may seem extravagant. But, time will rapidly fill up its capacity, and make it none too large (if large enough), for the requisitions of a doubling population, with the too sure accompaniments of poverty and insanity.

The suggestions of a removal of the two departments from the Blockley site, and the selling of the property are well worthy attention.

VENTILATION.

SECOND PAPER.

VENTILATION may be divided into two kinds, forced and natural. The former requires an engineer and high pressure steam boilers, engines, pumps, complicated machinery, etc. Forcing air into apartments creates unpleasant currents, annoying those with whom it comes in contact, disturbs dust, dirt, etc., and keeps it constantly in motion. Natural ventilation is produced by the use of properly constructed stacks or flues of sufficient size and altitude to produce an ascending draught, which can be increased by heating it with the smoke and waste heat from boilers, or any other fires that may be in the building being concentrated into it, thereby insuring simple and natural force, and avoiding the cost and complicatedness of forced ventilation. A marked distinction exists between top and bottom, or downward ventilation. Top ventilation should be only used to waste heat and cool apartments; bottom, where they are to be warmed and ventilated; by exhausting the cold and impure air from the floor creates a partial vacuum, and induces the warmth to descend to the bottom, distributing it more equally and effectually, avoiding all unpleasant currents, disturbance of dust, etc. This makes it necessary to have a corresponding amount of fresh external air allowed to enter the apartments in such a manner as not to come into immediate contact with the occupants, by means of flues and ducts, warmed in winter and cooled, or in its natural condition at other times. The application of this mode of ventilation is extremely simple, and is within the reach of every housekeeper who maintains a kitchen fire, if the precaution is taken in building the chimney to allow ample space to accommodate the ventilation and the smoke pipe

from the kitchen fire. In addition to ventilating the entire dwelling, the water-closets and cesspools can be well ventilated into the same ventiducts. In public halls, hospitals, etc., where the waste heat from cooking is insufficient, extra fires, jets of gas, or surfaces supplied with steam can be inserted; but what is wanted is a more comprehensive appreciation of the importance and the necessity for ventilation by architects and builders, and not consider the entire subject a humbug, and unnecessary and only calculated to mar the beauty of their designs with unsightly projections and clumsy chimney tops, which if properly conceived might be made features of their designs, and give effect and boldness, instead of sameness and straight unbroken features to the edifices to be erected. The time is coming when it will be imperative for architects to make it a part of the study of their designs, as the evidences of its necessity and importance are being witnessed daily in crowded hospitals and prisons, and in asylums for children, the want of good ventilation is known to be the cause of many malignant diseases, weak eyes, and sore heads, besides planting the seed of future weakness and disability. Pure air is the gift of God the Creator, and man should not deprive his offspring and wards from the free and unlimited use of it. Some attempts at downward and bottom ventilation have been partially introduced in some of our public charitable institutions, by the indefatigable energy of individual member of their board of directors, after years of hard application; and the inmates bless them for it, as malignant diseases have been stayed and prevented, while these noble persevering men have been awarded the praise as the inventors of the system which we know they do

not claim themselves; as the principle is as old as creation, it will scarcely bear the appellation of application. The Creator intended it to be so, and it would be so, but man places obstruc-

tions in the way of its accomplishment, with his solid walls, sealed windows, and no outlets for ingress nor egress of the precious bountiful gift—pure air.

B. F. FELTWELL.

THE ARCHITECTS OF BALTIMORE.

IN our preceding number we had barely an opportunity of presenting the facts of a case which involves the standing and respectability of our profession. We allude to the dictatorial "notice" addressed to the architects of Baltimore, by the Executive Committee of the Maryland Asylum for the Deaf and Dumb; which curiously (we are inclined to say appositely) enough styles itself "*Deaf and Dumb Asylum!*" requiring the professional services of any of those who will go to work and get up a set of designs to suit the peculiar ideas of the gentlemen composing this "Executive Committee," which the latter will accept or reject as it may to them seem proper; and in the event of an acceptance they will consider the amount of remuneration to be allowed for such labor of hand and head, as entirely discretionary with themselves. To which the indignant architects unitedly returned a dignified remonstrance. This was met as might naturally be expected, by a refusal to accept the just terms proposed.

The combined stand made by the architects of Baltimore, reflects credit alike on themselves and the profession they adorn and defend. It has the hearty support of all our brethren throughout the nation, and cannot fail in its noble purpose of teaching thoughtless ignorance, and repelling open insult. The gentlemen composing that noble little band are, each and every one of them, distinguished, far above their would be dictators; and have lasting monuments of their taste and talent to point to, which bear testimony to the true value of their services, while those

who seek to depreciate them only display their ignorance of what is due to educated skill; as well as their total want of good taste in thus attempting to undervalue the value of professional services which the community, by common consent acknowledges and accepts.

We trust that the Institute of Architects will move in this matter, and the profession throughout the whole country make common cause with those of Baltimore, in the vindication of their position in society, permitting no man or body of men to dictate terms to them, or attempt in any way to overrule what well established custom has long since acknowledged and endorsed.

Let this dictation on the part of the Building Committee in question go unrebuked, and there will not be a Board of Trustees, or set of men entrusted with the obtaining of plans throughout the country, that will not take the hint and lay down terms of remuneration for every architect whom they may see fit henceforth to favor with the magnanimity of their patronage.

Some poor groveling aspirants there may be who will feel but too glad of an opportunity such as this to squeeze their name into notice; but the public is made of too genuine material to patronize such creatures.

Here in Philadelphia we have a similar sample of liberality. Six architects were invited to compete for the design of the Pennsylvania New University. Three of whom were to receive graduated premiums. But as three were to go unremunerated, all declined! That is the true professional spirit.

CONSTRUCTION AT SUMMER RESORTS.

"THE COTTAGE BY THE SEA."

IT has become an overruling fashion with our "people of means," to betake themselves to the sea-shore at this particular season of the year; as though in these dreaded dog-days, they sought in self defence, the presence of that terror of the rabid canine—the water. Be that as it may, the acquisition of health is the ostensible motive for this annual flight to the beach, where all the themes of poesie may be realized, and "the shells of ocean" gathered in their be-clogged purity of sand and mud. Health is the object; and recreation, unrestricted by business amenities, the means by which that desirable object is sought to be obtained. To secure health there is as much in the plan and construction of the dwelling, as there is in clothing. And, strange though it may seem, yet it is a fact that there is a great oversight in this very matter.

"The cottage by the sea" is often anything but a shelter from those recurring storms to which its location is so liable. Storms of wind and rain which the denizens of inland homes are total strangers to, and which the tiny houses they are rocked in are but too little able to bear up against. The sudden transitions from tropical heat to arctic cold, are trials on a delicate constitution which should be provided against in the construction of those season shelters; yet they are not by any means defences against occasional bad weather. They are, in truth sea-side shells of a larger growth than those which shelter the more domestic denizens of the deep; and not at all as calculated for resistance to outside pressure, as those handiworks of Nature's Architecture.

Wooden construction is the common practice in the erection of dwellings by the sea, whether cottage, marine villa,

or many-roomed hotel; and the conflagration of last year gave a sad, but, alas unheeded lesson, on the folly of this mode, as regards combustibility, but too unquestionable, in the scene of destruction at Cape May. But the same risk is again run by the votaries of fashion, with that inconsiderateness of danger that makes the moth seek the fatal source of its misfortune and play around it still.

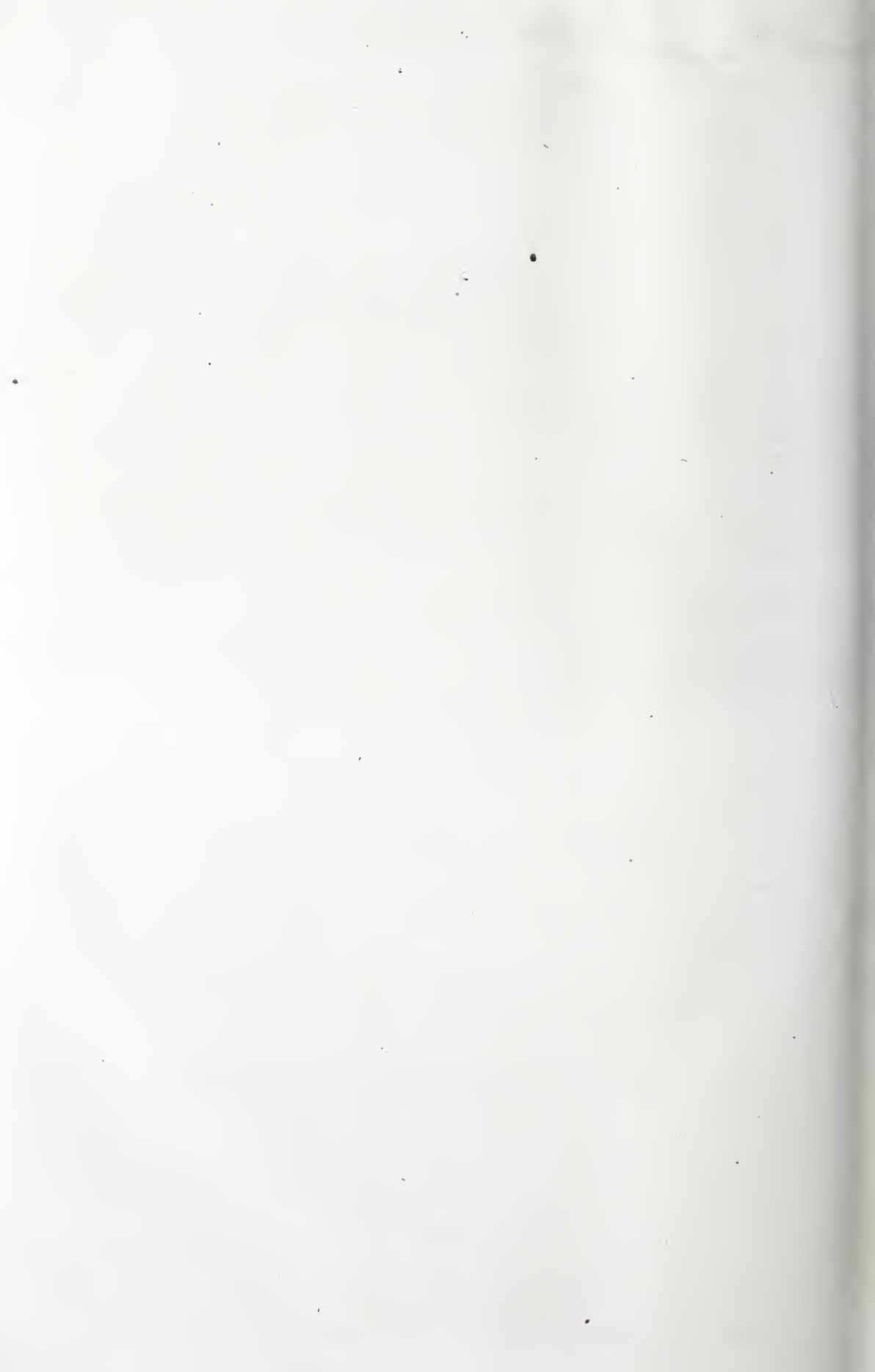
There are many constitutions which cannot stand the sudden changes of temperature; and no doubt consumption has seized on its prey at those watering places, which are resorted to as healthful. Now, no one will deny that the sea-breeze and the saline atmosphere, are conducive to health. Neither can any one assert that the cutting wind and the driving mist are not inimical to a predisposed pulmonary weakness. Why then not guard against the insidious enemy, while we seek the friendly aid of the health-giving characteristics of the sea-shore?

The great preventive of incipient consumption is to be found in the proper construction of the dwellings, large and small, intended for the accommodation of the season-visitors at those scorching or blustery places of resort. The walls should be of sufficient thickness to ensure retention of warmth, or to offer a proper resistance to the storm or the cold. Fire-places should never be omitted, and the plan ought never to lack ventilation; at the same time that thorough draughts are to be especially guarded against. As to building material, wood is in every way unfitted for the walls of sea-shore structures, as it will rot out rapidly, besides being eminently combustible. Stone, concrete, or painted brick, are the only materials



Design for a Cottage





properly adapted to walls in such necessarily exposed locations. Sea-shore sand should never be used either for mortar or plaster, and the covering of roofs ought not to be of shingles.

To all this we are perfectly aware that the answer will be that it is expedient to use wood, for the reason that these are but "summer houses," and got up in a great hurry to meet an immediate demand. That brick or stone would incur a greater outlay than the temporary occupation calls for; and so forth. It is true that these habitations are used only for the season; but that season, it will be remembered, recurs every year, and therefore there is a permanency about such buildings, which would demand more solid and secure material than mere wood. These houses are unoccupied through the winter and spring, the very season when cold and damp prevail, and exercise to the full extent their influence in rendering them unhealthy for use in the succeeding summer, unless fires be kept up and the rooms be properly aired during the vacation. To do this with frame houses, is not as easy as when the walls are substantial, and will retain the heat. Besides, the frame house is particularly objectionable when the action of the weather, in course of time, makes it mouldy in the hollow of the walls, giving out an odor anything but agreeable, and impossible to abate.

There is, to be sure, a certain expression of prettiness about these wooden constructions, when tastefully designed, which can be produced in this material easier and better than in brick or stone; and moreover it is far more economical, when the same amount of work is taken into consideration. Indeed, it possesses still another advantage, namely: that an elaborate ornamentation can be attained in wood, that cannot be executed in the same degree, in brick or stone.

We have more than once alluded in these pages to *concrete* and *béton* as materials, or rather as modes of con-

struction; and we would be inclined to promote the idea of their perfect adaptation to the building of just such cottages as are wanted for those sea-side summer resorts, so attractive to the denizens of our great cities. For, it is not mere *bathing boxes* that are adapted to the wants of those who have left behind them palatial homes of luxury; although they expect to find less of grandeur, they certainly look for convenience, if not perfect comfort, even at these temporary retreats. Walls of pill-box thickness are ill adapted to comfort, and not very conducive to health. "The cottage by the sea" should have manifest strength, and not admit for an instant the possibility that the tidal wave might raze it, or the blasts of Boreas blow it away!

If brick is to be used as the material for building, it will be highly necessary to have the walls hollow, in order to cut off the passage of the moisture oozing through the brickwork on the outside, thus preventing that damp in the rooms, so pernicious to health.

The outer face of brickwork is but too apt to *honey-comb*: so that a mode of protection is necessary at the sea-side. The defensive coat may be of cement: or, it may be paint well laid on in three coats; but the former is preferable for permanency as well as appearance; the latter requiring renewal every year.

But, there is still another protecting coat for exposed walls, and that is *slate*. This excellent material, if carefully put on and secured, will not alone last, but will be more effectual than any other.

If stone be used for the walls, studding the inside is absolutely necessary, and cementing the outside would be very judicious; for, the effect of damp on sea-shore is far more to be feared, than in locations which are free from the influence of a saline atmosphere.

Slating might be applied to frame walls with much more propriety than clap-boarding, and it could be arranged with a view to artistic effect in the design.

Convenience internally, and appropriateness externally, are the great objects to be sought for in cottage construction. We do not look for grandeur of effect in such compositions; on the contrary, *snugness* is what is required without and within.

A cottage may be two stories, but should not appear more than a story and a half. For, to show two full stories in the elevation would deprive it at once of its characteristic feature, and make of it a prosy effort in place of a poetic reality.

It is not necessary, however, to subdue the proportion of height of principal rooms. There is quite as much reason to have a high ceiling in a cottage, as in a more pretending mansion; and should the pitch of roof belonging to the style be sufficient to admit of height in the attic bed-rooms, so much the better.

The accompanying designs are for cottages constructed for convenience, comfort, and health, as well as for effect, either in a landscape, or in the locality of other tiny retreats.

The first plate illustrates our ideas on this subject. The effect is that of unpretentious comfort, a clustering of shady nooks and gabled projections, giving light and shade in just such degrees of harmony as best accord with rural independence. No stiffness of dignity, no straining of appearance, all is subdued yet engaging; and irregular, yet natural; a summer home of quiet life.

An examination of the plan will give an idea of the arrangement of such a cottage. It will be borne in mind that, as the perspective shows, the little structure is elevated on a plateau, forming on two sides a terrace, the inclined fronts of which are sodded, and rustic steps inserted in them at desirable points.

This elevated plateau gives a chance to have in the rear a basement kitchen, etc., with cellars in the front. Such an arrangement is very necessary; for, cool-

ness is a desirable object in summer resorts; especially for kitchen and cellar location.

The usual accommodation of parlor, dining-room and kitchen, together with china-closet, and pantry, are here shown. Over each of which are sleeping-rooms and dressing-rooms, bath, etc.

The bay-window is a desirable appendage to the cottage, as it not alone adds to the dimensions of a room, but it gives advantage of view which the ordinary window does not possess.

The second illustration is in the same style, under a different treatment. The plan affords a chance for the introduction of diversity of effect. The height of the plateau will give an opportunity for cellarage, dairy and laundry, but the kitchen will be over ground in the wings and adjacent to the dining-room. The heat and culinary odor will, by this arrangement, be kept away from the principal rooms. Connected with the dining-room is a china-closet, and between it and a chamber is a passage leading into the kitchen.

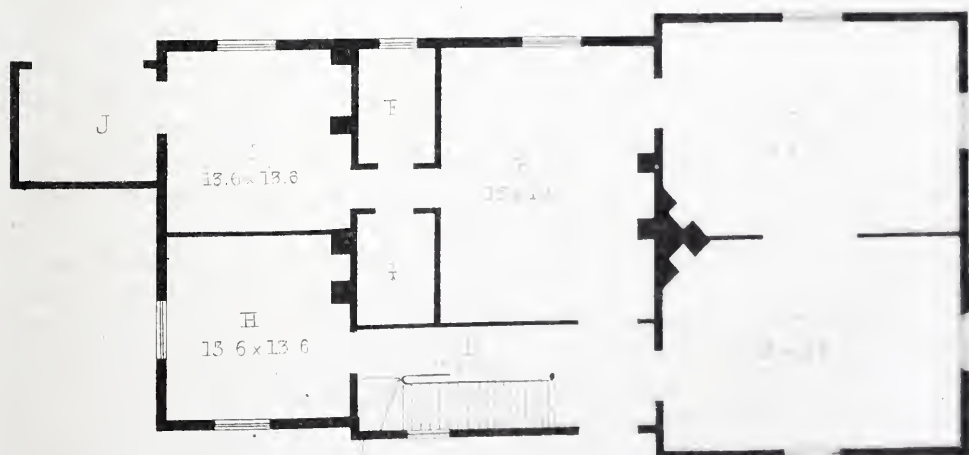
The roof should be thoroughly ventilated by open ornaments at the gables and patent revolving ventilators at the combing. If double sheathing were had recourse to, so as to admit a current of air entering under the eaves and passing to the garret, and so on out through the ventilators, the upper part of the cottage could be kept cool in the great heat of summer.

The basement should be either flagged or cemented; and care should be taken to drain the whole site in the completest manner; otherwise such dwellings must be unhealthy. Main drains should be sunk lower than the foundations, and have an efficient fall, either to lower ground, or to a covered cess-pool remote from the cottage. Surface drains should be provided to carry off drippings from contact with the walls. These should discharge into the main drain.

A good and sufficient cistern should receive all the rain-water from the roofs.



Cottage - Corn



Plan



ARCHITECTURE AND THE DRAMA.

THERE are many instances of the alliance of art to be found in the biography of prominent architects. Some divided their devotion at the shrines of Painting and Sculpture as well as of Architecture. And some again, turned their attention to the Thespian Art. Of the former, Michael Angelo was the most remarkable. Among the latter we find such men as Sir Christopher Wren, Sir John Vanburgh, Messrs. Jones, Nash, and, in our own day, Charles Matthews.

Sir Christopher figured in the character of Neanias, in a comedy called "Hey for Honesty, down with Knavery," performed in 1652, before the Elector Palatine and other personages of note. It was a quaint translation of the *Plutus* of Aristophanes. Whether the great English Architect made his appearance in other parts we know not, but this, at least, chronicles the fact that the drama had its attractions for him.

Sir John Vanburgh was the Architect of the original Haymarket Theatre, and was likewise its joint manager, with the well known dramatist Congreve. He wrote many successful plays, which, although abounding in wit and sprightliness, were only fit for the licentious times in which he lived, and could not be reproduced in this our day.

Mr. John Nash, once so well known and so bitterly criticised for his architectonic monstrosities in London; such as the Langham Place Church, yecept "Nash's Candlestick," and various other outrages on taste which gave rise to the joke of the *Nashional* style, nevertheless had numerous admirers of his mode of filling the character of Lord Ogleby.

Mr. Jones, the "walking gentleman" of Covent Garden Theatre, once the most admirable of genteel comedians, as well as a successful professor of Elocution, was likewise a member of the architectural profession.

Mr. Charles Matthews is known to our play-goers as having delighted crowded audiences in the chief cities of the United States, not many years since. He was a pupil of the elder Pugin, and a young man of much promise in his first profession. Having received a good education, polished off with accomplishments, he made the ordinary tour of Europe, on the completion of his term of pupilage, with a view to studying the examples of various styles to be seen in the chief Continental cities. Finding on his return that his mother, just left a widow, was in indigent circumstances, and regardless of the repeated objections of his father to his "going on the stage," he looked only at the necessity of the case, and knowing the obstacle "youth" was to an architect, he donned the "sock and buskin," flinging the Five Orders (with his father's order) to the winds, and built up that reputation as a light comedian, of which he may truly be said to be his own architect. So that, we see in art, whatever phase it assumes, an attractiveness that will even cause him who professionally superintends upon the *scaffold*, to submit to be critically supervised upon the *stage*. And the same spirit which controls him in the compositions of architectural design, likewise inspires him in the elimination of dramatic character. In each his aim is to please, and where he is original, there is he an object of respect, in whichever profession he struggles for eminence. Sir Christopher Wren had a mathematical genius; so that his efforts in comedy must be looked upon as proofs at least, of great versatility, changing the temperament

"From grave to gay, from lively to severe."

Sir John Vanburgh was not of a philosophic turn, and therefore changed with an easy grace the drawing-pen for the quill-dramatic.

HOMES FOR PEOPLE OF MODERATE MEANS.

THE first urgent necessity of the settler in a new location is the shelter of a dwelling-house. The man of humble means casts about him how to make his little capital reach far enough to supply that indispensable element of comfort. Its cost, therefore, comes in to govern the question of what material shall be used, and how large or how small it shall be. The ruling consideration is cheapness—how to get a tenantable house for a small sum of money. Hence the singular shifts we witness made by worthy men of small means to provide themselves with homes. Hence the rough and comfortless shanties set up in a single day upon the prairies, in the outskirts of every growing town, and wherever coal and iron are mined. All these are evidences of manly effort to secure a home, no matter how humble, at the lowest possible cost, and they show that with the masses, cheapness is the primary consideration in the building of a house.

How best to accommodate these masses has not been made, by professional American architects, as much of a study as has been done in other countries. In Europe, governments have proposed prizes for the best plans for cheap houses, and competition thus invited has shown that in this ample field the opening for improvement was not only extensive, but lucrative. But in our Western cities, where lumber is a low-priced staple article, great wholesale manufactories of portable wooden houses have been established, not by professional architects, but by shrewd mechanics educated only to the saw-mill or the planing machine. These wooden structures are supplied at all prices, from a thousand dollars down to one hundred. The various parts are so accurately fitted at the factory, that when arriving at their destined location on the prairie,

most of them can be put up by the owner, whether mechanic or not, and occupied in a day. Shelter from the sun and rain, the first pressing family want, is thus immediately provided. Though taste in construction cannot be expected here, yet these cheap structures show a certain rough neatness, whose effect upon the eye is generally very pleasing. Sometimes the owner indulges in a coat of paint, but as frequently eschews it. He rarely ventures on the luxury of venetian shutters. His house is confessedly a temporary home, tolerated only as the stepping stone to a better one in the future. He begins at the bottom of his ladder to fortune, courageously adapts himself to circumstances, and lives on in his portable domicile until the annually increasing products of his now uncultivated prairie are sufficient to supply the means for better things. The summer sun may open wide cracks in the siding, or let in the rain through others in the roof, but he holds on to his frail shell, yet careful to adopt expedients to cure these defects as they present themselves. In time the interior will be plastered, and the board roof will be covered with shingles. These difficulties overcome, his comfort is assured until the better house appears.

No one who has not visited these huge manufactories of portable houses can have any correct idea of the magnitude of their operations. They are in keeping with the gigantic scale on which business of all kinds is carried on in the west. On their premises one may see millions of feet of lumber piled up for use. In the factory is machinery of the completest description for the purpose. Labor is thus wonderfully economized, and lumber is worked up with the least possible waste. Every class of customers are accommodated, exactly as is done by the great manufacturers of packing boxes.

Houses are annually turned out by the thousand. When finished the several parts are strapped together in portable packages, and great trains of cars go loaded with them to all sections of the country.

Cheap house-building has thus taken its place among the exact sciences, at least in wooden portables. Skill, enterprise, machinery and capital have combined to supply in the great west one of the most pressing wants of humanity. Were it not for this combination, thousands of the finest acres of prairie land would to this day remain unsold and unoccupied. Were it not for the vast network of railroads radiating over them from every central western city, these cheap and bulky houses could not have been transported to the purchasers. But by immediately relieving the settler from the care and delay of building in a new region where roads are few and supplies a great way off, with wages at the maximum, they have served as stimulants to the purchase of tens of thousands of acres, and to this day constitute an important element in western prosperity. It is believed that the log cabin is a purely American invention. It may be safely asserted that the portable house is another, as well as a better one. The rude log cabin, planted immovably in the forest was a structure in advance of the saw-mill and the wagon road. The portable house is a natural offshoot of the saw-mill and the planing machine, deliverable wherever required, a sightly and comfortable contrivance, and when superseded by a better one, is removable at small cost to do duty as a tenant house or out building. Its wholesale production is a striking illustration of the keenness of American enterprise in seizing on the supply of every great public want the moment it is discovered to exist. There may be higher genius in *creating* a new want; but he who is shrewd enough to detect one already existing, which no one has yet supplied, will commonly find the highway to

fortune an open road. The very simplest contrivances have been, in this country, the stepping stones to great wealth.

This public willingness to put up with temporary homes has been everywhere observable. When Philadelphia was first settled, many of the adventurers were men of education and considerable means. Yet they cheerfully adapted themselves to the discomforts of their new position. Some sheltered large families in caves dug in the bluff, which then skirted the city front. In one of these caves the first white child was born. Others built rude huts by setting up young timbers in a square, then covering them with pine or cedar bark to keep out the rain. The wigwams of the Indians became popular boarding houses. Others camped out under great canopies of pine and laurel. Religious meetings were held in tents formed by sails from ships in which the congregations had crossed the ocean. In every instance the first want was shelter. These accommodations were tolerated only until better ones could be provided. In the first year of the settlement some three hundred houses were built. The picket shanties were given up, the wigwams abandoned, and the caves vacated, yet all to be reoccupied by the next influx of adventurers. But every city must be many times rebuilt. All these primeval expedients to avoid the sun and rain have disappeared. Of the houses first erected to supersede them, but very few now remain. Others, of really substantial character, took their place. Even these have been demolished, and far more costly structures occupy their sites. These last also, will in time be replaced by even more expensive buildings.

Architectural taste and skill have made prodigious advances within thirty years. The public wealth has grown beyond computation. The two have combined to rebuild Philadelphia for the third or fourth time, now converting the ground once occupied by wigwams into

avenues of palaces. Every suburb is being embellished with elaborate architectural monuments. The substantial but clumsy country seats of the merchant princes of the last century are rapidly disappearing, their broad acres being divided into villa plots, with modern cottages springing up in platoons, surrounded by lawns on which an exquisite floral taste has been expended to render these retreats all that human ambition ought to desire. But like changes are occurring almost everywhere, for every town must be rebuilt.

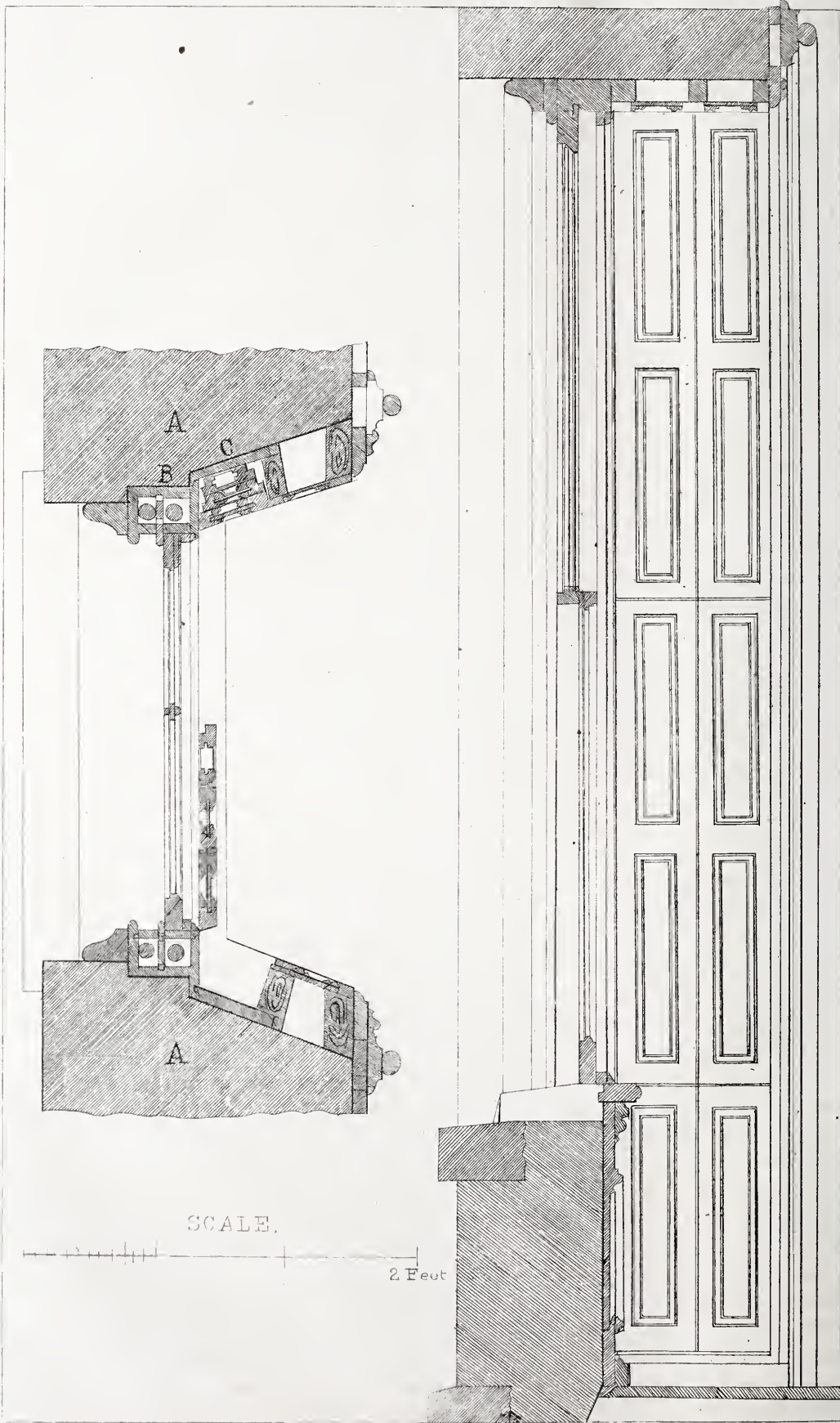
The facts recited show how a city begins. We can see for ourselves how it grows into a congregation of palaces. We can only conjecture where it is to stop. But the great underlying fact is, that in the beginning of the family settlement, multitudes are content to occupy extremely humble homes. The first imperative want is to be sheltered. Do not too many of us fail to realise that this want is as urgent in a great city as upon the prairie? There, the supplying of that want has been organized into a great industrial enterprise. The new settler is a mere laborer. But Philadelphia is full of such, with equal urgency demanding shelter. With multitudes of these, two rooms will be sufficient for their present wants. They will occupy them only until able to pay for three or four, for they too, have courageously begun at the bottom of the ladder, and will assuredly mount higher. When they do so, other beginners stand ready to take their places; for it is a noteworthy fact, that go where one may in Philadelphia, the humblest one-roomed hovel has its tenant. It is so in every other city. Nothing shows more conclusively that the great unsupplied want is shelter. It is this that has given birth to tenement houses, and to the crowding of small families into one or two rooms.

The only organized attempt to supply this family shelter for small tenants has been the odious tenement system. In Philadelphia, however, it has never ob-

tained any extensive foothold. But on the other hand, no systematic plan combining skill, enterprise and capital, has been carried out for creating cheap homes for beginners of moderate means. The number of these is so great as to make the supply of their wants a vast business. They earn wages more certainly than the prairie settler. They receive them weekly, and can pay rent, and when the prospect of obtaining a home presents itself, they make heroic sacrifices of comfort to secure it. To a certain extent the ordinary building association meets their wants, but it is generally too slow, as well as too exacting. The houses they find for sale are too costly, being larger than they need. They are required to buy six rooms when they need but three. We thus come back to the idea suggested at the outset, that with small owners, cheapness is the primary consideration in the building of a house, and that cost must govern size. If building for this class of purchasers could be so cheapened that moderate men could acquire homes at less price and on better conditions than at present, the inventor of such process would find himself overwhelmed with business. As in all departments of human effort there is an incessant struggle for improvement, so this of house-building should not be overlooked. It is believed that new and available plans will be suggested, coupled also with modifications of the usual co-operative machinery, such as will enable those who choose to have a home, to readily secure it. Some ideas on the subject may be submitted in a future article.

M.

DRAINING THE FLATS.—A new scheme for the draining of the Hoboken flats has been set on foot. It is proposed to build a stone canal from twelve to fifteen feet wide, and eight to ten feet in depth, to run at the foot of the ridge, with an opening on the boundary line between Jersey City and Hoboken, and another above the old Weehawken docks.



Rosenzweig 529 Walnut St. Phil.

WINDOW-SHUTTERS-DETAILS.

PRACTICAL CARPENTRY.

WINDOW FINISH.

THERE is a great diversity in the mode of style in which windows are designed; and therefore there are various ways of contriving and executing what is called in joinery "the finishing."

The window is invariably governed in its finish by the pervading style of the building; of which it forms no mean feature. On the contrary, the window alone sometimes declares the style itself. The *frame* and the *sash* are the principal parts of a window. The former is stationary, the latter movable; so that the sash is liable to greater diversity of finish than the frame.

Sashes are either hinged, pivoted or hung. Sometimes they are made to slide horizontally, but only in peculiar cases. In houses of very economical finish, it is usual to make raising sashes without suspending, or hanging them. But it is a bad mode, though cheap. The frame consists of *styles*, head-piece or *lintel*, and a *sill*. The last is made wider than the others and is weathered. The frame is sometime rebated, to receive the sash. But, in most cases, the practice is to insert permanent slips, the former mode requiring heavy sides of scantling; the latter being constructed of boards. However, in fixed sashes for cellars, etc., the solid frame is always used.

Sashes hung on butt hinges are generally known as *French*, although that mode prevails in Italy, Spain, Germany, and, in fact, all over the European continent. The hung sash (with cords, weights, and pulley) being distinguished as *English*.

The *French* sash require a solid frame, rebated. Great care must be taken to render these as weather-tight as possible; especially at the meeting-rails, where they shut against the re-

bated sill. In exposed places they should be always made to open outward. The wind then acting to keep them tightly closed. Few windows can compare in appearance with the French; but in comfort and convenience they are unequal to the English. Suspended sash, as we have remarked, are hung in frames, having boxes, sheaves and cords, with sufficient balance weights, to allow of the sash being hoisted or lowered with facility, and not requiring exertion. A reference to the accompanying plate will show the plan of sill, and a vertical section of the frame with the slips enclosing the sashes, as they run up or down the styles. The sashes are composed of styles and rails. The bottom rail of the lower sash is deeper than the others, and is throated to prevent the rain water or fine snow from driving under it. The meeting-rails of the two sashes are made wider than the others, and fit together as exactly as possible.

Of the sash bars, the vertical or upright are always in one continuous piece: the horizontal or cross-bars being cut and fitted tightly into them.

Where inside shutters are used *boxings* for their reception are required; and these are proportioned to the number and breadth of flaps used. Nothing is in worse taste than a broad shutter: and indeed the fashion is now the reverse of this; flaps are made as narrow as to barely admit of a panel. Such being the case the finish presented by the face of the boxed jamb, would be awkward to a degree if a stationary box-panel were not introduced, as shown in the accompanying illustration. A, being the wall. B, the pulley-box and sash style. C, the shutter-flaps folded back in their box. D, the shutters, opened out against the window on one side.

The "Boxings" are formed in the space between the inside lining of the sash-frame and the framed ground. The back of the recess should be sheeted (called back lining), although it is sometimes plastered. The shutters are paneled in a similar manner to doors, having mouldings to agree with the general interior finish. The front of the hollow box, between the face of the jamb and the shutter-box C, being of the same width as the latter, will have pannels similar in all respects (as shown in the accompanying vertical section).

This plan gets rid of the *back flap* required by the old style of broad shutters; which has such a poor appearance when the shutters are opened out against the windows. The whole exposed surface in the modern arrangement here given presenting a uniform appearance.

In this country, more than in any other, window shutters are made a presentable feature, for the reason that in the most pretentious residences, it is customary to keep the rooms darkened during the hours when the sun is on them; and also when the family is absent. Their finish is therefore a matter of much moment.

The modern custom of keeping the window within eighteen or twenty inches of the floor, leaves but little chance for panneling the recess, which in former days was called the "breast," and in which it was once customary to construct a permanent window-seat, called the "window-stool," the front, sides, and back of which were paneled and moulded; the seat hinged and cushioned, and under it was a locker.

The soffit of a window frame should be paneled, and finished in all respects like the shutters.

The finish of the window openings in the room, is by moulded architraves of precisely similar design to those of the doors in the same room. Their width is also the same. We will treat of various styles and shapes of windows

in future articles, accompanied with illustrations, and give plain instructions for their execution. The subject is one of very great interest to all young practitioners, and is intimately connected with design.

EXTERIOR FINISH—DETAILS—GABLES.

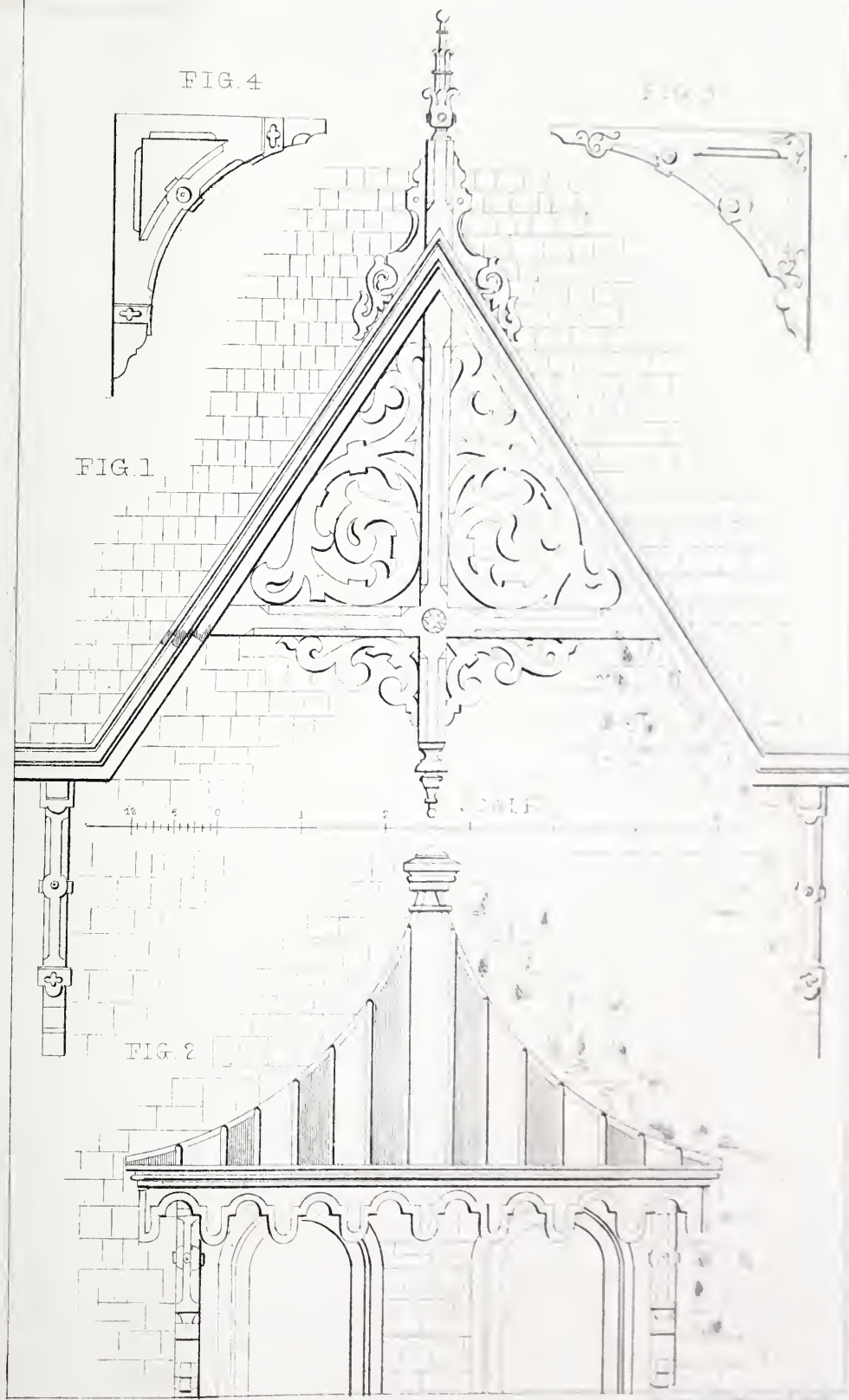
The breaking up of a roof into gables of different sizes, is productive of excellent effect; especially in square or cubic forms of building. It gives "life" to a design, and eases it of that monotony otherwise inseparable from unbroken lines of eave. But, although the cubic plan stands most in need of such remedies, any roof may be greatly improved by the introduction of gables and gablets.

In the accompanying engraving we present some details applicable to this subject.

FIG. 1. Represents either a gable or gablet, enriched with open-work panneling and center standard, with ornamental finial. This latter has foliated supporters, and is, like the framing pieces of the pannels in the gable, judiciously champhered, as well as moulded.

These open-work gables are highly ornamental, and tend very much to create that peculiar effect which we find so pleasing in some suburban villas.

FIG. 2. Represents a window-canopy, being a most useful as well as ornamental feature of suburban architecture. The frame of such canopies is covered with thin sheathing boards, and is then either tinned or overlaid with strong canvass. In any case it is tastefully painted, usually in stripes of contrasting colors. The ribs are sometimes ceiled with thin plank on the under side, in narrow strips; or they are left exposed, their edges neatly and tastefully champhered off, and the whole judiciously painted. The finish of this soffit of the window canopy is of more consequence than would at first appear. This surface is subject to inspection from the inside of the window when the shade is



GABLE ROOF WINDOW CANOPY & BRACKETS

FIG. 1

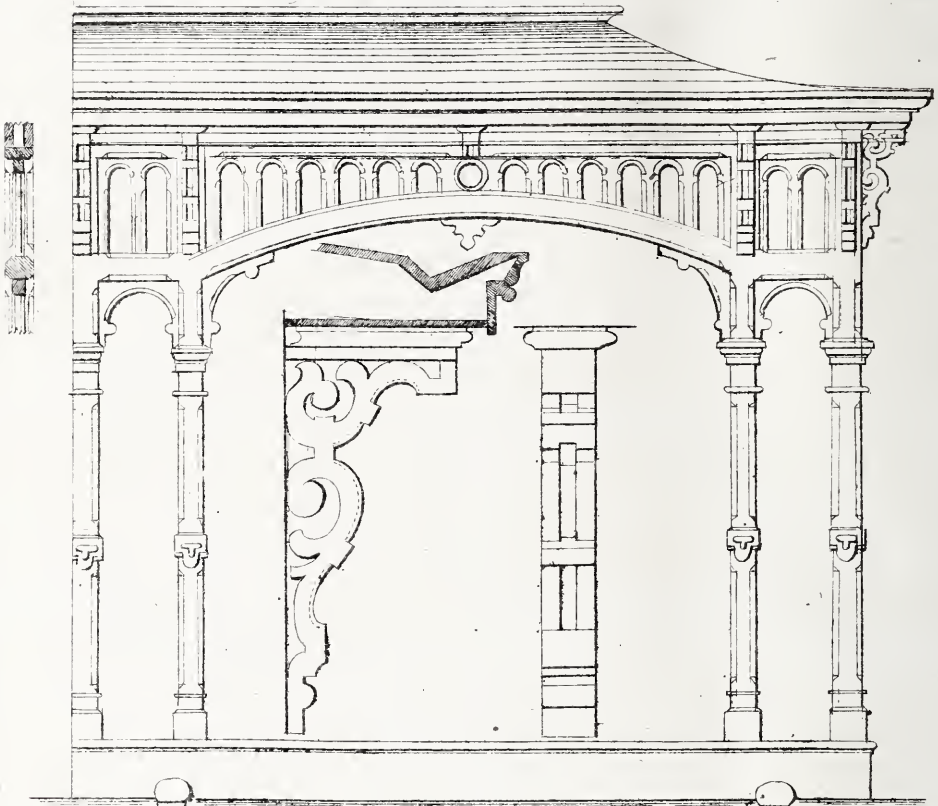
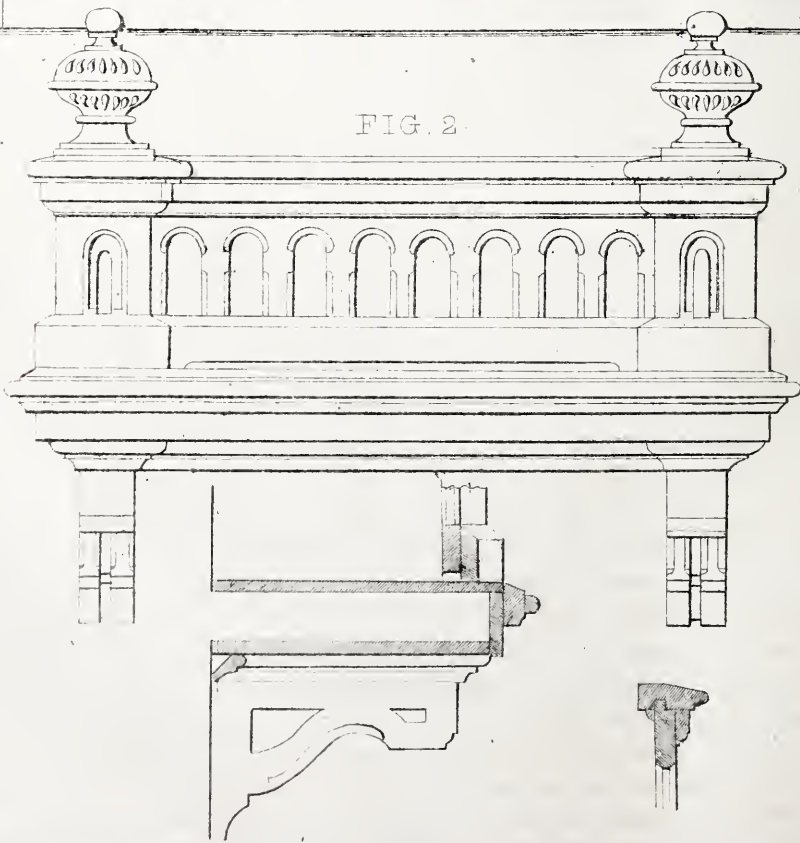


FIG. 2



W. C. Smith & Co., 327 Walnut St., Phila.

drawn up; and, indeed, it obviates the necessity for any such article of furniture as the shade, for the canopy itself is a fixed sun-shade.

FIGURES 3 and 4, are suggestions for brackets suitable for the foregoing gable or gablet, and window-canopy, and will be found to be in harmony with the general design. These are different in finish from each other, and calculated to suit several modes of treatment of rural architecture, but more especially the Swiss style.

A boldly projecting eave as well as a window-canopy, will give a good chance for such brackets to prove their utility as well as beauty.

It will be observed that notching and champhering are the chief features of their construction. The tasteful use of buttons and rosettes is desirable as their embellishments.

VERANDAH—BALCONY.

The verandah, like the window-canopy, is a sun-shade, on a more comprehensive scale, under which one may sit or walk in the cool enjoyment of a mid-summer day. The pierced-work of the spandrills and fascia, shown in the illustration, are well calculated to produce the effect of lightness.

FIG. 2, is a part of a balcony, with the same feature of open panels, which prevails in suburban modes of construction of the style illustrated in our frontispiece for this month.

The brackets which support it are solid, and give assurance of ability to sustain the weight imposed upon them. And here we may venture the remark that although this balcony is actually supported by the bearing of its frame upon the wall, and would stand without any bearers, yet the appearance of such gives confidence, and hence the necessity for having them solid to add to that effect. The brackets which support the cornice of the verandah, are more for ornamentation than actual service, and can therefore be designed in a florid

style. The cornice being in itself a light object under which solid supporting brackets would be out of place.

THE FRONTISPIECE.

SURROUNDED by scenery of natural and artistic beauty, there are few styles could compete with the one here represented, as a rural residence, or suburban villa home.

In some of the preceding descriptions we have given the details of its verandah and balcony, as well as the finish of its gables. This last feature being a great relief to the design; without which it would have but a dull appearance.

The walls are of *cyclopean masonry*, and as this latter is beginning to obtain in building, we shall here describe it verbally, as well as by the engraving; which is itself a fair representation of that peculiar mode of building.

Cyclopean masonry is very ancient: in fact its origin is unknown. It is certain that it was used long ere the invention of the Orders by the Greeks, and derives its name from the superstition which attributed it to the Cyclops, a race of one-eyed giants who inhabited Sicily, and were workers in iron under that father of blacksmiths, Vulcan, who is said to have kept his workshops under Mount Etna, for the convenience of forge-fire.

This peculiar masonry is a large irregular mass of stone, having three, four, five, or more sides, hewn only on the irregular sides to be built upon, begins a wall: To this mass others are added, the sides of which are made to fit the irregular sides of the first block: and on these again, others of similar forms are built in the same manner.

It constructed of vari-colored stones, this Cyclopean, or, as it is often called, "random" masonry, cannot fail of presenting a very attractive effect. Many specimens of it are now to be seen in some of our large cities, especially in school-house buildings. The design of this frontispiece is one of those villas which must ever prove highly popular.

LESSONS FOR LEARNERS.

INTERCOLUMNIATION—COLUMNS WITHOUT PEDESTAL.

IN the preceding lessons on intercolumniation, we spoke of the use of columns with pedestals; we now come to treat the same subject with columns having no pedestals.

Considering the height of entablature from platform to be the same as in the former lesson, the treatment will be alike, as far as the intercolumniation and arcading are concerned, the distances and dimensions being, of course different. For, as the interspacing is measured by the diameter of the columns used, the necessarily increased diameter of such columns, when applied without pedestals, must diminish the width of the opening, and consequently increase the height of the chords of the arches from the platform.

We will now compare the Tuscan and Doric respectively, without the pedestal, with the same orders (as shown in the preceding lesson) with the pedestals; each being according to Vignola.

THE TUSCAN, without the pedestal, affords but six modules and a half for the width of archway, and thirteen modules for the height (from platform to soffit). While the same order raised on pedestal, gives eight modules and three-quarters, to the width of archway, and eighteen modules and two-thirds for the height; also, making the breadth of the pier four modules; against three modules in the former.

The total height of the portico from the platform to the soffit of the listel or fillet, crowning the cornice, is sixteen modules and two-thirds.

THE DORIC, without the pedestal, allows only seven modules to the width of opening, and fourteen modules to the height from platform to soffit of arch. While the same order with the pedestal gives ten modules to the width of opening, and fifteen to the height.

The Doric Order, however, being governed in its intercolumniation, by the spacing of its triglyphs and mutules, Vignola makes a difference in the distance, from center to center, of each column, under the respective arrangements of elevation on pedestal, and standing simply with the base on the platform. Thus, he gives fifteen modules, from center to center, of the pedestal example, while to the unpedestaled he gives but ten modules. That is to say, he places the latter one-third closer in the intercolumniation than the former.

This reduction gives an exceedingly elegant proportion; not alone to the intercolumniation, but to the arched opening. We would once more ask the particular attention of our learners to these points as being worthy of close observation, for on them will sometimes depend the triumph or failure of a design. The justly celebrated façade of the Louvre, at Paris, owes its consequence to the skill and taste exhibited in the intercolumniation, and the manner in which the spaces were rendered, not alone proportionate in themselves, but strikingly accordant with the entire front.

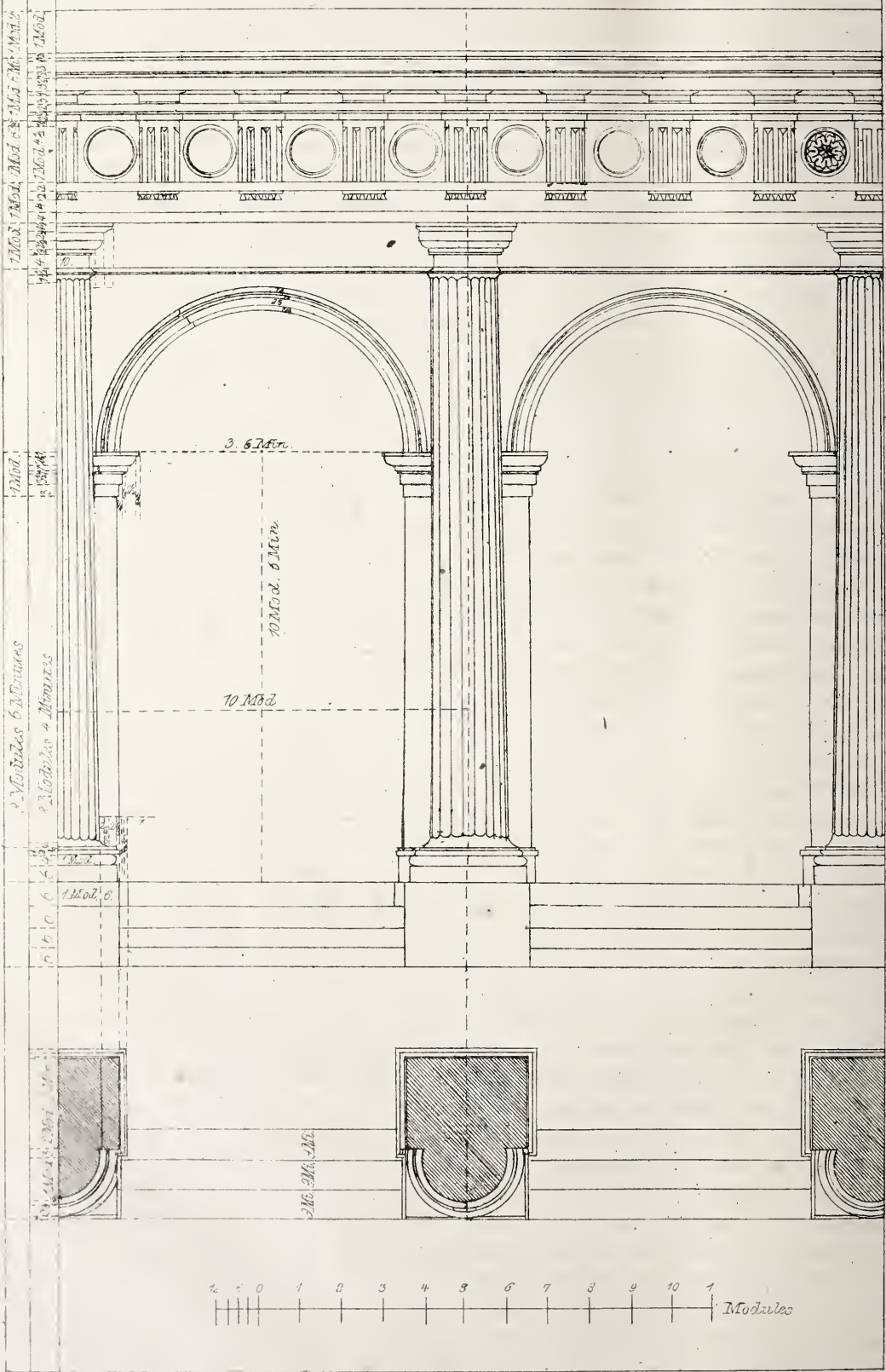
It is to be regretted that writers on architecture do not dwell sufficiently on this subject of intercolumniation, and that in consequence, the student is left too much to the guidance of his own inexperience, and too often fails in his effort to effect something which, with the aid of a little information, he might have most easily succeeded in.

It is not to large façades that intercolumniation is confined. Our very hall-door fronts, with or without porticoes, are as eminently in need of tasteful proportion as they are.

The great difficulty which accompanies the designing of hall-door fronts, lies in the fact of the necessarily reduced







Intercolumniation Doric - without Pedestal

Rosenfeld, 327 Walnut St. Phil.

dimensions of the order used, and yet the demand to be met of space or intercolumniation. This it is which so frequently destroys the proportion of height to breadth, and which gives the front a spread out appearance, indicative of weakness as well as of disproportion.

We are not in favor of using the classic orders in so mean a service as that of embellishing a mere hall door space; but unhappily that peculiar notion prevails, and has prevailed for centuries past, and is not at all likely to die out like other less objectionable ideas. So that it is necessary for the student to prepare himself to cope with the difficulties it presents.

ORDER OVER ORDER.

Next in degree of consideration, for the learner of the subject of intercolumniation, is that of the arrangement of columns above columns. Which is sometimes, and, we must say, too often effected by using the one order throughout. That this is an unarchitectural practice, is as certain as that it is inartistic and consequently ineffective in its appearance.

The Doric or Tuscan should occupy the first story as they are plain and robust, and bear evidence of being equal to the task of sustaining any burden imposed upon them. If the design be of the Grecian style, the Doric will take this place. If Roman, or Romanesque, the Tuscan will be most appropriate. But in the event of an elevated platform, or rusticated basement occupying the first story, then the cornice of such (if any were used) must be in either of these orders, conformable to the style. But, whether or no, this basement must be only the height of its order. The second story would be the Ionic. The third story the Corinthian. And higher than this we do not deem it good taste to go. For, the delicacy of the Corinthian will not permit of its being subjected to a greater apparent weight than that presented by its own cornice; and

the ornamentation of this beautiful order is quite sufficient as a finish for any façade.

The gradation of the orders, in the successive stories of an elevation, is sufficient of itself to produce that regularity of decrease, which is looked for in a well proportioned design; and such gradation is obtained by using but one and the same diameter for all the orders successively introduced.

We will here present the proportions of the four orders spoken of, viz: Tuscan, Doric, Ionic and Corinthian, with their relative decrease. All being of the same diameter. We take Vignola as our standard, to prevent that confusion which must necessarily arise from the citing of different authorities.

Tuscan.—Seven diameters to the column.

Doric.—Eight diameters to the column.

Ionic.—Nine diameters to the column.

Corinthian.—Ten diameters to the column.

Taking the full height of each order in modules, or semi-diameters, we have:

Tuscan.—Eighteen modules, for base, column, capital and architrave.

Doric.—Twenty modules and a half, for the same.

Ionic.—Twenty-two modules and a third, for the same.

Corinthian.—Twenty-five modules for the same.

It will be seen that the last (Corinthian) increases more, in proportion, than the others, and this may be deemed an advantage in the placing of order over order; for, the Corinthian being raised high, looks less or diminishes more than those below it, and consequently gives more harmony to the whole.

Against employing only one order throughout, there is but a single argument. The same diameter being used for all, the order diminishes at every story, until at the fourth it is fairly dwarfed.

To attempt to increase the height of each would make the diameters too large.

NORMAN ARCHITECTURE.

IN Normandy, in the tenth century, when the Normans occupied Neustria, the churches in other parts of France were in imitation of the Roman style. The plan of the buildings came from Rome, and the round arches, the pillars, and the mouldings which were employed in their construction, had the same origin. But the corrupt taste of a less civilized people covered the capitals and the portals with a crowd of such appalling images, as a wild fancy was likely to suggest, and a rude hand to portray.

The Normans, adopting the habitual plan and the established style, rejected the meretricious accessories, and resolved to trust for success to the two great principles of size and elevation. The oldest of the Norman churches are the plainest, but even these aspire to dimensions which could not fail to command admiration. Their character is severe but sublime. At the same time, the Normans had the boldness to insist upon an addition to their churches, which is admitted to be the grandest feature and the chief ornament of ecclesiastical buildings, the central tower. Towers had, fortunately become an integral part of churches before the Normans began to build in Neustria, but the few towers which at that time existed in other parts of France, only adorned the western end. Size, elevation, simplicity, and strength together with the central tower, are the architectural peculiarities to which the Normans, as contradistinguished from the Franks, possess undeniable claims.

Norman workmanship was, at first remarkable only for its solidity. The walls were often built of rubble, faced with small squared stones, a manner of building which had been copied from the works which the Romans had left behind them in France. The pillars were of course, composed of larger blocks. By degrees, and in buildings of importance,

larger blocks were employed in the walls; but the joints were wide, and the mortar was coarse. In the time of William the Conqueror, greater neatness was accomplished; the stones were squared, and the courses regular; but the joints were still rather wide, and the mortar unsifted.

Another mode of construction was with long narrow stones, which were placed, not in horizontal courses, but alternately inclined to the right and left. This, from the appearance it presented, was called the herring-bone fashion. It did not remain in use much after the eleventh century.

The Norman walls were of great thickness, and were filled up with small stones, among which mortar was poured in hot. This was called *grouting*; and in time the whole mass so hardened together as to acquire the consistence and strength of solid rock. Such walls stood in no need of buttresses, through the means of which more advanced science obtained an equal amount of power at less labor and less expense. Buttresses, however, appear on the exterior of early Norman buildings, but seem to have been introduced only to relieve the baldness of the surface. They project so slightly that they can add but little support. In early Norman buildings the buttresses never rise above the cornice.

The plan of the early Norman churches are always that of the basilica, with a semicircular recess at the end, which recess formed the choir. The larger churches have transepts and side aisles which are divided from the nave by arcades. The small churches have often neither side aisles nor transepts. The arches of the nave either rest on piers, to which half pillars are attached, or on single pillars, but hardly ever on those huge cylindrical piers which are commonly seen in the Norman churches of England. Indeed the thick

cylindrical piers of England are scarcely to be met with in all France, except in one or two crypts, where the known superincumbent weight justifies the preference of strength to beauty.

In the churches of France, single pillars preceded piers; the exact reverse of what might have been expected, when it is not recollected to what an extent and degree France had become Roman, previous to the inroad of the Northern conquerors. The pillars have always capitals, which at first were perfectly plain; but, from the beginning of the eleventh century, were enriched with different kinds of foliage, to a certain degree departing from, but still seeking to imitate the Roman models. The half pillars, which are attached to the ends of the piers, are always set back in recesses, or sinks; the same is the case with the small pillars on the outside of the windows, as also with those of the portals. This is a characteristic between the Norman style and the Roman, the Norman pillars are recessed; the Roman project.

The windows are round headed and undivided; and, externally, have on each side a small recessed pillar, which supports an impost and moulding.

In the gable, over the entrance door of churches, a small circular window is sometimes introduced.

The windows of castles and of domestic buildings are usually divided by a single shaft.

The portals are round headed, and were gradually enriched by an increasing number of semicircular mouldings. The most common mouldings are the billet, the nail head, the chevron, the zigzag or embattled frette, hatchet, nebule, star, rope, beak head, dog-tooth, and occasionally, different sorts of foliage, as the vine, the bay, the ivy, etc.

The external cornice, under the eaves of churches, was sometimes a moulding describing a series of semicircles, under a projecting course, and sometimes a series of blocks. The ornamented cor-

bels, on the exterior churches, were adopted by the Normans, before imagery was admitted into the interior of the edifice.

The roofs of the early Norman churches were of wood, except the part over the semicircular chancel, which from the first were vaulted with stone. The side aisles were vaulted with stone, as were, sometimes, the comparatively small naves of village churches. The vaulting was composed either of small stones let into a bed of mortar or of tufa, or of light calcareous stone, which is found in many parts of Normandy. The most ancient vaulting is without ribs, and the most ancient ribs are without mouldings.

The dome vaulting over the side aisles of the abbey church at Berney is the only specimen of the kind in Normandy.

The first and purest Norman style prevailed till the latter part of the reign of William the Conqueror, from the early part of the tenth till nearly the end of the eleventh century.

The abbey church of Berney, begun in the first half of the eleventh century, is the oldest Norman building of any consequence which remains in its primitive form. The architecture of the interior is plain to baldness, but the dimensions are imposing.

The abbey churches of Jumièges and Cerisy were begun in the first half of the eleventh century. The Norman portions of the cathedral, and of the church of St. Taurin, at Evreux, as also of the church of Mont St. Michel, belong to the same period.

St. Georges de Boscherville, and the two great churches at Caen, are splendid examples of the architecture at the time of William the Conqueror.

In all these buildings the character of simplicity is preserved, but some ornament in the details begins to make its appearance before the close of the Conqueror's reign, as for instance, in the embattled fretted moulding round the

arches of the nave of Matilda's church at Caen, in some parts of St. Georges de Boscherville, and other places.

The florid Norman was already developed in the early part of the twelfth century. Of this style a rich specimen is afforded in the arcade of the nave at Bayeux. The arches are ornamented with a multiplicity and variety of mouldings of intricate design and elaborate execution.

Another specimen of the florid Norman exists in the neighborhood of Bayeux, in the church of St. Gabriel, built by Robert Gloucester (1128).

The abbey church of Montivillers (1117), and the church at Gravelle, are instances of the florid style in all its exuberance.

NORMAN ARCHITECTURE IN ENGLAND.

Of the architecture which existed in England, previous to the introduction of the Norman there are no certain vestiges. The most competent authorities have decided that hardly anything which can be proved to be Saxon remains in existence. Part of a few churches, which have all the marks of a very remote antiquity, and of which the style differs materially from the Norman, may be suspected to be Saxon. Their distinguishing features are a ruder imitation of the Roman, projecting, instead of recessed pillars, and the combination of diagonal with perpendicular forms in the external ornaments of towers. Such is the case at the old church of Barton, in Lincolnshire, and at Earl's Barton, in Northamptonshire.

Some persons have imagined that the generality of the Saxon churches were merely timber buildings, but this appears to be a mistake; for in Domesday Book, which takes note of 1,700 churches, one, and only one, is specified as being built of wood; and Henry of Huntingdon speaking of a particular church, says: "It was not built of stone, but of wood, and covered with reeds, as is the custom

in Scotland;" demonstrating that it was *not* the custom in England.

Not only were the Saxon churches not merely timber buildings, but some of them were constructed at a considerable expense, and with much architectural ornament.

In the seventh century, a church was built at Lincoln, which Bede says was of stone, and of good workmanship. The church of the monastery of Wearmouth was erected in 675, by Abbot Benedict Biscopius, a noble Northumbrian, who, at twenty-five years of age, detached himself from the service of King Osway, and embraced a religious life. He brought over masons from France to build his church in the Roman manner, and, when the building was nearly finished, procured artificers from the same country, skilled in the mystery of making glass, to glaze the windows.

The conventional church of Ripon, and the cathedral church of Hexham, were both built by Wilfrid, Bishop of York, in the second half of the seventh century; and were both constructed of stone, and supported by pillars and arches. Wilfred also imported builders and artists from abroad—from Rome, Italy, France, and other countries.

In the eighth century, the monastery of Croyland was built by Ethelbald, King of Mercia; and the church of St. Peter at York was rebuilt by Archbishop Albert, and consecrated just before his death, which took place in 780.

Alcuin describes this church as having pillars, arches, and porticoes.

In the ninth century, the progress of the arts was interrupted by the constant incursions of the Danes. All that had been done was destroyed, and little more than repairs, and military works, could be undertaken till the peaceable reign of Edgar, in whose time the abbey of Ramsey was founded, and the church built by Ailwin, then alderman of all England. This church was built in six years, and finished in 974. It was in the form of a cross, and had pillars,

arches, and two towers, one of which was supported by four pillars, or piers in the middle of the building. This appears to have been the first English church that had a tower so situated, or that was built in the form of a cross.

From these descriptions of the Saxon churches, preserved in the early chronicles, it appears that the Saxon style was, like that of every other country, an imitation of the Roman. The abbey church of Ramsey, which was one of the latest, and one of the most celebrated of the works of the Saxons, was completed in six years. The latest Saxon work of importance was the abbey of Westminster, built by Edward the Confessor, and finished and consecrated in 1065, one year before the Conquest. This church is represented to have been of a different character from that of any preceding structure in England; and this difference undoubtedly consisted in an approximation to the Norman method of building. Edward the Confessor had been brought up in Normandy, and was almost reproached for his incessant endeavors to introduce Norman customs and manners.

The churches and monasteries which arose after the Conquest, were constructed after a new manner of building. From all this it appears that there must have been a marked difference between the Saxon and Norman fabrics. But, as both were an imitation of the Roman, the difference must have consisted in the dimensions and the superior workmanship and magnificence of the new structures. It must have been the same style on a grander scale, and executed in a more scientific manner.

At the time of the Conquest the Anglo-Saxons were in every respect a ruder and less civilized race than the Normans had by that time become.

The earliest work of the Normans which exists in this country was conducted by Gundolph who, after rebuilding his cathedral at Rochester, was employed by William to superintend the

construction of the White Tower, in the Tower of London, which contains within its walls perhaps the only ecclesiastical remnant of the Conqueror's time at present in existence.

In the course of the Conqueror's reign several cathedrals, abbeys, and castles were built, none of which remain in their original state. A remnant of the Conqueror's time existed at Canterbury till within these few years, the northern tower, at the west end of the Cathedral. This was a part of the work of Lafranc. The stones of which it was built were irregular, and the joints between the courses were wide.

Several castles have the reputation of being of the Conqueror's time, but, on close investigation, will be found to have been rebuilt in after years. Such is the case with the castles of Norwich, Rochester, the keep at Conisborough, and many others.

Within less than a century after the Conquest almost all the cathedrals and abbey churches of England, besides innumerable parish churches, were either wholly rebuilt or greatly improved by the Normans, on whom William and his successors conferred the best of ecclesiastical preferments. By the introduction of these Norman prelates the Norman style was rapidly diffused, at first, however, so much affected by the state of art in this country, as to give to the English building the character of a Norman building of much greater antiquity.

Rufus was a great builder; his principal work was the great hall of his palace at Westminster. This hall, as it now exists, was altered by Richard II., but much of the original work was left, and during the late repairs, portions of this were visible. The lower part of the walls was faced with rubble: the courses were irregular; the joints wide. Remains of a triforium or gallery were discovered, which had been carried along the sides of the hall, half way up. The capitals of the pillars on which the round arches of this gallery rested were plain cubes. The

whole of the workmanship was coarse. The plan of the churches about this time was the same as in Normandy. All were built with the semicircular chancel which in England, afterwards fell into such general disuse that few traces of its existence are to be found in this country. It is however, to be traced in that of St. Bartholomew-le-Grand, in London (begun in 1123), in the minster at York, at East Ham, Essex and in other places.

The arches of the nave usually rested on those heavy cylindrical piers which in French churches are hardly ever to be found, except in crypts. Their prevalence in England must be ascribed to the inexpertness of the native workmen, and the probability is, that they had previously been adopted by the Saxons from their inability to imitate the Roman style in a more satisfactory manner. Sometimes to adorn the cylindrical piers, the Anglo-Normans introduced the spiral groove winding round them, with the net or lozenge-work spreading over them.

The windows and the doors were the same as in Normandy, and the Norman mouldings were gradually introduced with little alteration. The walls are remarkably thick, and without prominent buttresses.

Specimens of the time of Rufus are to be seen in the choir, side aisles and middle transept at Durham; in the walls of the lower part of the western façade of Lincoln; the towers and transept of St. Alban's; the oldest remaining part of Winchester; and the east end and cross aisle of Worcester.

The walls in this reign were irregularly built, and the joints continued to be wide, as may be seen at Durham, Lincoln, Winchester, and other places.

The style prevailed in the early part of the reign of Henry I., as may be seen by the ruins of St. Botolph's priory, Colchester, which was built by Ernulph, a Norman monk, in the first years of that prince. Here are the same heavy cylindrical piers, the same stumpy propor-

tions, the same poverty of mouldings. But in the course of this reign an impulse was given to architecture by one of those men of genius, who effect the character of the age in which they live. Roger Poor, Bishop of Salisbury, a Norman by birth, and combining in himself the offices and the qualities which, in those times of constant commotion, were often united, was much distinguished as a prelate, a warrior, a statesman and an architect. William of Malmsbury relates, that the walls which were built under the superintendence of Roger of Salisbury were so smooth, and had such fine joints, that they seemed to be made of a single stone. Had fine joints been in use before their appearance in the works of the prelate, would not have been so much extolled. The admiration with which they are mentioned gives us the date of the first introduction of fine joints in the walls of English buildings. From this time progressive improvement took place in other parts of the fabric. Something like decoration was added. The portals began to be enriched. The architecture of England ascended to the level of the architecture of Normandy in the time of William the Conqueror.

Examples of the style of this reign may be seen in the naves at Gloucester, Norwich, Ely, Durham and Southwell; also in the lateral towers of Exeter cathedral, built by Bishop Warlewast; in St. James's tower, Bury St. Edmund's; in the ruins of the chapter-house at Rochester, built between 1114 and 1125, by the same Ernulph who built St. Botolph's at Colchester, and who, on the death of Gundolph was promoted to the see of Rochester; in the portal of the round church at Cambridge; in the nave of the church at Dunstable; in Saint Bartholomew-le-Grand, London, which was begun in 1123; in St. Sepulchre's, Northampton, built by Simon de Liz, second earl of Northampton, on his return from the Holy Land, and who died in 1127; and

in the abbey church of Tewkesbury, begun by Robert Fitz Hamon (who died in 1107), and consecrated in 1123.

EXAMPLES.—Portal of the chapter-house at Durham built by Bishop Galfred Rufus, between 1133 and 1143; church of Castle Acre priory, Norfolk, consecrated in 1148; church of St. Cross, Hampshire, Ripon minster; St. Frideswide (now Christ church), Oxford, begun not later than 1150, and finished in 1180.

About this time, or a little later, Domestic architecture began to make its appearance in England, though from the dimensions and arrangement of some of those buildings which have come down to our time, it is difficult to determine whether all of them were destined for dwelling-houses, or were only halls for public occasions, or for the courts of the feudal lords.

Of these buildings the invariable plan is a parallelogram of two stories; sometimes a double parallelogram. The lower story was vaulted as we have seen to have been the custom in Normandy, and it had no internal communication with the upper story. The upper story was approached by an external staircase, which probably was moveable. The only fixed Norman staircase now extant is the one at Canterbury.

The probability is that the lower story was occupied by the servants, and the upper story by the masters; but in none of the buildings of this time now extant do there exist any traces of subdivisions.

An example of Norman Domestic architecture existed in Southwark till within a few years. It was the hostelry or town residence of the priors of Lewes. The church of St. Olave, Southwark was confirmed to the prior and convent of Lewes, by William, second Earl Warren and Surry, the son of the founder. Earl William died in 1138. It appears, however, that the priors of Lewes rented a building in 1170 and 1186, for their occupation in London, whence it may be concluded, that the hostelry in question

was not built till after that period. The general features of the portion of the hostelry which remained till lately, nearly resembled those of the manor-house of Boothley Pagnel, Moyse's Hall, at Bury St. Edmund's and the building which is called the Pythagoras School at Cambridge.

In 1826 was still existing at Barneck, Northamptonshire, a Norman manor-house, which was not built for defence. In this instance the hall, which was the principal feature, was on the ground floor and had no vaults underneath. The hall consisted of a center and two side aisles. The fine joints of the walls of this building denoted that it could not have been built before the middle of the twelfth century.

At Bury St. Edmund's, is a Norman domestic building, which goes by the name of Moyse's Hall.

At Boothley Pagnel, in Lincolnshire, is a Norman manor-house on nearly the same plan. In this are a fire-place and a chimney, which indicates that the building of which it forms a part, cannot be older than the second half of the twelfth century. This edifice has windows in the ends as well as the sides: a circumstance which makes it evident that to this building no others could have been attached. It is surrounded by a moat.

At Christ church, Hants, is a Norman remnant which has also a chimney.

At Lincoln is a Norman domestic building which goes by the name of "John of Gaunt's Stables," but which, in fact, was the public meeting-house of a guild. It is so much enriched as to be placed late in the reign of Henry II.

These examples prove that about the middle of the twelfth century, mansions, distinct from castles for defence, began to be erected in England; and that, independent of colleges, abbots' lodgings, and the hospitable parts of convents, instances existed of Domestic architecture. But it was long before dwelling-houses acquired a character

bearing any relation to the quality of the proprietor, or were constructed with much regard to convenience.

Examples of the Norman style of the time of Henry II., are to be seen in the abbey gateway, Bristol; in the Galilee, or chapel, at the west end of Durham, built by Bishop Pudsey (1154 to 1197), together with the lateral portals of the nave; in the new nave and great west portal of Rochester, etc.

It was in the latter years of the reign of Henry II., that the struggle between the Round and the Pointed styles, which is called the Transition, began to take place in this country.

Kirkstall abbey, in Yorkshire, was built in the thirty years preceding 1183. The nave arches are pointed, but the pillars are massive, and the windows and portals are round. The church at Roche abbey, though equally in the Transition style, and having round-headed windows above pointed arches, Norman mouldings and capitals, yet is of a less heavy character. Both buildings, however, denote that during those years the new style was only just beginning to be received in England.

About the same time (1170) Archbishop Roger employed the pointed style in the new crypt of York minster.

But the early examples of the Transition, of which the dates are known with the most undoubted certainty, are the round part of the Temple church, London, which was consecrated in 1185, and the choir of Canterbury cathedral, which was rebuilt after the fire in 1175, and in which the Pointed style was introduced by John of Sans, a French architect. Other instances are to be found in the great tower at the west end of Ely, built by Bishop Ridel, who died in 1189; in the county hall of Okeham, Rutlandshire; in the abbey church of Glastonbury, etc.

But the nave of Rochester, and the nave of Peterborough, rebuilt between 1170 and 1194, are proofs that the old

fashion was not at once superceded by the new.

Simultaneously with the introduction of the Transition style, hewn stone vaults appear to have been first thrown over the wider parts of the English churches which till then had been habitually roofed with wood. A stone vault was thrown over the new choir of Canterbury in 1174. It was customary before that time, to roof narrow spaces with plain cross-vaulting, but not to vault wide spaces with stone. Plain cross-vaulting of rubble, with and without ribs, had been adopted before in crypts, side aisles and chancels. Barrel-vaulting, we have seen, was introduced in the time of William the Conqueror. From the time that the choir of Canterbury was built, which was not long after, it became common to throw stone vaults over the naves of the larger churches of Normandy, and hewn stone vaults, plain at first, and gradually enriched, became habitual in England. Prominent buttresses as in Normandy followed in the train of stone roofs.

From this time, the Round style fell gradually into disuse; but at Fountain abbey the foundations of which were laid in 1204, and which was in progress during the forty subsequent years, the windows and portals are still round-headed, and an instance of a round portal is to be found at Kelton, in Rutlandshire, so late as 1252.

During the reign of Henry III., the Early Pointed style attained its most perfect condition. Fine examples of this style are to be seen in the chapter-house, the transepts, and part of the choir of Westminster Abbey; in the choir of St. Albans; in the nave of Lincoln; east end of Durham; nave of Worcester, 1224; nave and spire of Lichfield; south transept of York; and the older part of the choir of Southwell; and in Salisbury cathedral, which was begun in 1221, and carried forward, without interruption till it was completed.

The establishment of the Pointed style

was attended with one remarkable difference in England and Normandy. In Normandy, the semicircular chancel became generally speaking, polygonal; in England, generally speaking, it became square. Polygonal chancels are as rare in England as square chancels are in the larger churches in Normandy; and this difference of shape in England afforded the opportunity of those magnificent east windows, which are so principle and so splendid a feature of our cathedrals. Another difference to be remarked is the battlement, which usually forms the para-

pet of English churches, and which never occurs in the ecclesiastical buildings of France.

It may be said: 1. That the supposed existence of the Pointed style in Normandy, in 1056, is imaginary. 2. That the Normans, adopting the corrupt Roman style, gave it a character of their own. 3. That the Normans greatly contributed to the advancement of the arts in England. 4. That architecture performed exactly the same revolution in England and France, France having, in all the changes, a certain precedence.

LANDSCAPE GARDENING. NO. 5.

BY H. W. S. CLEVELAND.

THE order in which I conceive the work of designing the arrangement of ornamental grounds should be conducted is in general terms as follows: First, the character which it is to assume. This must be determined from various sources, of which perhaps the most important is the character and tastes of the proprietor, and the objects to which he will be most likely to devote himself. A moment's reflection will show the truth of this assertion. The man whose tastes were social, and who would be likely to maintain a generous hospitality, would require a very different style of arrangement from that which would best please the man, whose habits were those of the student; who preferred seclusion, or the society of only a few chosen friends. Again, the man who has a decided taste for floriculture, and collections of rare plants, shrubs and trees, should have his tastes especially regarded in the arrangement of plantations, which to him would be a source of the highest pleasure, while they would be utterly thrown away upon the man whose tastes were absorbed in cattle and horses.

I think, therefore, that the tastes of the proprietor are first to be studied, and they

may often serve to determine the question of the objective point to be aimed at, and also the degree of polish (so to speak) which is to be given. This also is in a great degree dependant upon the neighborhood, with which it should at least present no offensive contrasts. Having determined what is to be the general character, whether it be the rich and costly residence of the millionaire, or the simple home of the man who seeks only rest and comfort, the next inquiry should be on the score of convenience in the performance of every necessary duty. The position of the kitchen, garden, and the arrangement of all the drives and walks so far as they have reference to purposes of utility, should be governed by this requirement, for it may be laid down as an invariable rule, that the obvious sacrifice of convenience to fancy will never prove satisfactory in the end. These points being fixed, the last, and yet in some respects, the most important work remains, of securing esthetic effect in combination with these various requirements. And this is the crucial test of the artist, for unless he has an innate taste which governs and guides him in all he does, he can never acquire the power of easy

and graceful arrangement by the study of all the books that were ever written on landscape gardening. From these he may learn rules which indeed are essential, but which no more comprise the art of landscape gardening, than a knowledge of mixing colors comprises the art of painting. There is a degree of excellence in every kind of art which cannot be taught, and which few can attain, though happily, many can appreciate and enjoy, when its result is before their eyes. The artist preserves in all the details a unity of design, which confers an indescribable expression of natural grace and beauty upon the whole. Whoever looks upon it recognizes its character at once, though he is unable to detect any distinct feature to which he can attribute it. Now, so far as my experience enables me to form an opinion, the object with most landscape gardeners, is to furnish a plan comprising as much as possible of decoration and elaborate ornament. They seem to think its merit depends upon the amount of labor and expense its execution will involve. I have seen natural features which if they had been touched with reverent hands, might have been developed into scenes of exquisite beauty, so tortured into formal shapes in the process of grading that all natural effect was lost, and I have also seen very elaborately prepared designs, which in themselves were unexceptionable and yet were entirely inappropriate to the character and tastes of the proprietor. He wanted perhaps to create a pleasant and attractive country home in which to enjoy the comfort of rural domestic life with the least possible necessity of the care and trouble of an expensive establishment, and he is furnished with a plan involving such an extent of green-houses, conservatories, Italian gardens, and winding roads and paths, as would require a small army of laborers to keep them in order. It may be said that he should have explained what he wanted beforehand, but the truth is, very many of the people who retire to the country, after

accumulating a fortune in the city, have but a very indistinct idea of their wants, and no conception of the labor involved in the care of an elaborately dressed country seat. They depend upon the landscape gardener to furnish a satisfactory plan, and it is his business to study and interpret their tastes, and adapt his arrangements to them, and it is an evidence of innate vulgarity in himself if he resorts to a display of costly decoration, in the hope thereby to dazzle the fancy of his employer. The moral influence of a just appreciation of natural beauty, is as evident in giving a healthy tone of thought and feeling to the mind, as the physical effect of the pure air of the country in imparting strength and vigor to the animal system.

To attempt to substitute for it the love of ostentatious display of artificial decoration, is as truly quackery as to try to supply the place of wholesome food, by the use of confectionary, and artificial stimulants. Unfortunately, the mental and physical tastes of too many of our people are too depraved to be satisfied with that which is simply beautiful without meretricious decoration, or simply grateful to the palate, without the aid of condiments.

NEW CARVING MACHINE.—In the machine invented by Mr. Gear, of New Haven, Conn., the wood to be carved is fastened firmly to the bed by movable clamps, adjustable to suit any required size of wood, and the cutters are fastened to a spindle moved by a universal joint in any direction upon the bed of the machine. The cutter is guided by hand, the guide resting against the pattern. The carving can be gauged to any required depth, and made to conform to any required pattern. A fan blows away chips as fast as they are produced, leaving the work constantly in view of the operator. The same tool that cuts the mortice also cuts the tenon, the two pieces of work to be dovetailed being clamped together to the end of the table.

THE PRACTICE OF PAINTING.

SIR DIGBY WYATT delivered a lecture in the Fitzwilliam Museum, Cambridge, England, recently, before a distinguished company of ladies and gentlemen, upon the practice of painting. The former part of his remarks applied to the ancients, how they produced dark shadows upon a surface that was light, and having given various instances of the methods adopted for placing dark images upon a light ground, he said the process was seen in the boys first drawing upon a slate, and then upon paper with a pencil. It was at this stage that we arrived at the primitive pictures of the Egyptians. It appeared, however, that individual personation was first carried into effect by the Abyssinians. He treated of the styles adopted by the Greeks, and then of the materials used in painting, but, so far as processes went, it seemed that those used in ancient days were also used in the present. He spoke of the importance of education to the artist, who should have his eye, his mind, and his hand educated; he should first learn to draw, than copy others. Drawing from objects was excellent practice, and it was at this stage of work that the mind of the artist would become most actively employed. To be successful the artist must be able so to use his brush as to give a natural effect to his picture; there must not be too much light or too much shade; he must see in his mind what amount of color is required and how to apply it. The difficulty was to know how much dark to assign. He who would learn to draw correctly must learn to draw slowly, for if he got into a rapid habit he would not draw correctly, and his productions would be worthless. He considered the practice of using charcoal to be a very excellent one. In the drawing of a picture it was the most essential to know how much high light it would admit, and care must be taken

that transparent tints were introduced where transparency was required. Some surfaces will reflect light, others will absorb it, and, therefore, great difficulty would at first be experienced in giving expression to darkness in the expression of color. The difficulty of dealing with high light was in the calculation of the amount of color which surfaces would bear. The artist would find no better practice than copying tints prepared by others, and thus by imitation would find out the amount of color and light each tint would bear. He dwelt upon the demerits and merits of the works of artists. The demerits were when a picture excited pain, when the representation failed to lead the mind to anything, when nature was distorted, when there was a want of harmony of color, when the truth of color was not represented, and when there was a representation of some grand and good idea in a mere miniature form. The merits consisted of a just representation of form, race, age and natural features of humanity; of all that was beautiful without flattery, of dignity where dignity of expression was required, and vigor where vigor was necessary; in fact, for a picture to be true, it must be correct to nature.

FREE PUBLIC BATHS.—This necessity of all our large cities is at last acknowledged, and acted on by the Councils of New York and Philadelphia. Free public baths were advocated in the *REVIEW*, and met at first with little countenance. The plea of "impoverished city treasury," came up, which was thought to be unanswerable. But the need was absolute, and compelled the adoption of these sanitary institutions. At first they will be but temporary, tasteless make-shifts: cheap, but acceptable; soon the time will come when public baths will be architectural, and worthy of our people.

THE NEW CAPITOL OF IOWA.

THE following is a concise description of the new State structure to be erected at Des Moines:

"The building is to be erected permanent and fire-proof, and all the walls are to be of the very best dimension, stone. The height of the cellar is to be eight feet; the basement story to be fourteen feet; and the first, second and third stories are to be each twenty feet. There will be a cellar under the entire building, the floor of which is to be flagged with stone four inches thick, roughly dressed with good square joints. The stone flagging to be bedded in sand, and laid to a uniform surface. The top of the foundation will be covered over with a coating of asphaltum; the outside walls to be laid hollow and the other walls solid. The rooms, corridors, and apartments above the ground story are to have stucco cornices; State offices and committee rooms plain moulded cornices; with ornamental centers and moulded panels. The Senate and Representative halls are to have ornamental cornices and ceiling panel work. The dome to be paneled, with bold plain mouldings and ribs, and ornamental cornices, brackets and pedestals, with galvanized iron columns. The roofs to be constructed of iron; the ceiling over the basement to be corrugated iron; the floors are also to be constructed with iron beams. The entire shell of the dome, including columns, to be made of galvanized iron. The iron-work to be used in the building is to cost \$66,000. All the corridor floors to be tiled with light and dark marble, laid in alternate courses in diamond form; the stair railings to the grand stairway, and the two side stairways on either side of the dome, to be Tennessee marble. All the fire grates to have marble mantels. The corridors, Supreme Court Room, Governor's Reception Room, the House and Senate chambers and dome, will all

be frescoed; or in other words, tinted in colors to harmonize with the wood and scagliola finish; all the walls to be painted in oil colors; the ceilings in water colors.

The building will be supplied with water by two reservoirs, to be placed in the roof, twelve by twenty feet, and four feet deep; to supply these reservoirs a force pump, driven by a steam engine, will be placed in the cellar. The pumps will be connected with the rain water cisterns, which are to be built for the purpose of holding all the roof-water from the building. These cisterns are to be placed in the cellar. For heating the building, there are to be three first-class tubular boilers, and of ample capacity for heating the building by indirect radiation, with a surface sufficient to warm all the rooms and apartments in the building excepting the corridors and rotunda, in which last named places there are to be standing direct radiators placed to partially warm the same for the convenience of outsiders and lobbyist. All the rooms and apartments are to be heated to seventy degrees Fahrenheit, in the coldest weather. The direct radiators and rotunda will be covered with fancy screens and marble tops. The indirect radiators will supply heat through air ducts to be built in the walls, and through fancy registers placed in the side of the wall, except in the Assembly rooms, which are to be placed in the floor. These registers are to be made to open and close at pleasure.

The ventilating flues are to be furnished with registers in the walls close to the floor, the flues from which are to be gathered into the main ventilating shafts around the dome walls, the ventilation to be made to operate by the introduction of a fan to force the warm air into the various apartments, and exhaust the impure air out through the foul air ducts. The engine in the cellar is to be

of sufficient power to drive the fan, as well as the force pump, which will be required to raise the water to the reservoirs as before mentioned. Cold air ducts are

to be built under the cellar floor, running to the various coils and radiators. The ventilating of the building is to be as perfect as science can make it.

AMERICAN INSTITUTE OF ARCHITECTS.

AT a special adjourned meeting of the Board of Trustees, held May 23, 1870: Upon the opening of sealed ballots cast by Fellows of the Institute, it was found that the following candidates were duly elected as follows:

Levi T. Scofield, Cleveland, Ohio;
Joseph Ireland, Cleveland, Ohio; C. C. Miller, Toledo, Ohio; J. A. Vrydaugh, Terre-Haute, Indiana.

The Board adjourned to May 30th.

At a special adjourned meeting, held May 30th, the following business was transacted:

N. B. Kelly, of Columbus, Ohio, was duly elected an associate.

The following preamble and resolutions, prepared by the Secretary, were read and adopted:

Whereas, The Board of Trustees has heard of the recent demand of the British Government upon E. M. Barry, Esq., late Architect in charge of the New Houses of Parliament, London, for the original plans and papers used in the construction of that building by the late Sir Charles Barry and himself, therefore,

RESOLVED, That the Secretary for Foreign Correspondence be authorized and directed to convey to Mr. Barry the following expression of opinion on the part of this Board, and to furnish copies of the same to all the societies with which this Institute is in correspondence.

The Board of Trustees of the American Institute of Architects, convened in New York, this 30th day of May, 1870, deem it their duty, not only to E. M. Barry, Esq., but to the Architectural Profession, both here and abroad, to express their approval of the course taken

by Mr. Barry in resisting the demands of the British Government for the drawings and papers relating to the construction of the New Houses of Parliament, which had been made by the late Sir Charles Barry and himself. The Board of Trustees also take occasion to assure Mr. Barry that the right of ownership of plans and papers, by an architect who has been employed to carry out a work, has been maintained by the leading Architects of America during the past twenty-five years, and has been officially recognized by the American Institute of Architects since 1864. The Board of Trustees deem it to be of the utmost importance, not only to the architectural profession, but to those who avail themselves of the services of architects, that the principle of ownership in plans be everywhere maintained and enforced.

PORTLAND CEMENT.

THIS admirable material, so highly esteemed by architects and engineers in England, and about which American professionals cannot but feel interested, is manufactured on a large scale at Swancombe in Kent, and the *modus operandi* is thus described in a paper recently read by a student of the Institute of Engineers.

The manufactory stands on the banks of the Thames and occupies fifty acres.

"The mixing of the chalk and the clay, in the proportion of three parts of the former to one part of the latter, takes place in a series of double circular mills, about twelve feet in diameter, and three feet deep, touching one another, and each furnished with revolving harrows, to secure the perfect reduction of

the particles. The chalk is delivered in lumps into one of these mills, which is kept constantly supplied with water, and the liquid passes thence to the other mill, where it receives the clay. After remaining long enough under the harrows, the mixture is pumped up to a height of some feet, whence it flows by gravitation through wooden spouts into large reservoirs called 'backs,' where it lies till drainage and evaporation have disposed of the greater part of the water. While the liquid cement is in the 'backs,' samples of it are constantly taken and burnt in a sample kiln, so that any defect in the proportions is at once detected and remedied. The residue is then transported, first to drying stoves, and afterwards in due time to the kilns, where it is to be burnt. These are constructed on the endless principle, and are bell-shaped. They are about thirty feet high, and are fed near the top with alternate layers of cement and gas-coke. As combustion goes on, the clinker is drawn periodically from the bottom of the kiln; and, after the rejection of any that is insufficiently burnt, it passes to the mills for grinding. Special care is taken to do this thoroughly, as the strength of cement is found to be greatly enhanced by fineness of grinding."

LIGHTNING RODS.

THE many accidents which have occurred to buildings furnished with what are, for business purposes, styled "lightning rods," has induced people to place little, if any faith in that once popular fixture of the chimney top and gable points. The gross ignorance of a large number of those who dabble in lightning-rod speculation, led to this state of doubt as to the actual ability of the attachment in question to afford protection from the electric shock, and indeed the fear prevails now that lightning-rods are more dangerous in their attractiveness than otherwise. And so they are, if not made in strict conformity with the requirements of science.

In answer to a letter of inquiry made by the *Scientific American*, as to the best method of erecting and constructing lightning-rods, Professor Henry gives the following instructions:

1. The rod should consist of round iron of about one inch in diameter; its parts, throughout the whole length, should be in perfect metallic continuity, by being secured together by coupling ferrules.

2. To secure it from rust the rod should be coated with black paint, itself a good conductor.

3. It should terminate in a single platinum point.

4. The shorter and more direct the course of the rod to the earth the better; bendings should be rounded, and not formed in acute angles.

5. It should be fastened to the building by iron eyes, and may be insulated from these by cylinders of glass (I don't, however, consider the latter of much importance).

6. The rod should be connected with the earth in the most perfect manner possible, and nothing is better for this purpose than to place it in metallic contact with the gas-pipes, or, better, the water-pipes of the city. This connection may be made by a ribbon of copper or iron soldered to the end of the rod at one of its extremities, and wrapped around the pipe at the other. If a connection of this kind is impracticable, the rod should be continued horizontally to the nearest well, and then turned vertically downward, until the end enters the water as deep as its lowest level. The horizontal part of the rod may be buried in a stratum of pounded charcoal and ashes. The rod should be placed, in preference, on the west side of the building. A rod of this kind may be put up by an ordinary blacksmith. The rod in question is in accordance with our latest knowledge of all the facts of electricity. Attempted improvements on it are worthless, and, as a general thing, are proposed by those who are but slightly acquainted with the subject.

THE COMPOSITION AND SOURCE OF SOME BUILDING STONE. NO. 1.

SERPENTINE.

BY PROF. CHARLES P. WILLIAMS.

PROBABLY the most brilliant and varied rock employed for ornamental and constructive purposes, is that which gives caption to this, our first of a series of articles on building stones. Though long used elsewhere its appearance amid the architecture of Philadelphia—in fact in that of many of the cities of this country—is quite a novelty—a novelty, however, which is fast assuming the importance and position of a fashion, and which, suiting both crude and developed æsthetical views, cannot be without an important influence for good. Let us examine in how far the physical and chemical properties and composition of Serpentine will warrant its extensive use, and see what are the extent and nature of the deposits from which our supplies may be drawn.

Most of our building stones are not distinct mineral species having fixed and definite constitutions, but are rather aggregations of such species, frequently taking their name from the predominating mineral. They are, in a word, rocks, which geologists define as a congeries or assemblage of minerals. Thus Granite is, as is well known, a mixture of quartz with feldspar and mica, and is either quartzose or feldspathic or micaceous, as one or the other of the three minerals predominates. The chief exception to this definition of a rock is found in the case of limestone or marble, which is almost exclusively composed of carbonate of lime and is therefore, in very many instances, really a distinct mineral species.

Serpentine forms no exception to this rule which we have laid down as obtaining for building stones. It is also a mineral aggregation deriving its name and its chief characteristics and properties from the mineral species “Ser-

pentine.” Chemical analysis shows this to be composed mainly of three ingredients: the first, a familiar one to us all, found everywhere, and presenting itself to our gaze under a multitude of forms. We plough it up in our fields, recognize it in the hands of the lapidary, meet it in the cabinet of the mineralogist, and see it along the river bank, and on the sea-shore, and call it variously, flint or calcedony, quartz or sand. But the chemist has one name for it under all its Protean shapes, and that name is Silicic acid.

The next ingredient of our mineral species has basic properties and is the familiar substance magnesia. These two substances combined, the one with the other in the relation of acid to base, produces what would be called chemically a salt, to which both of the components stand sponsor, and which is therefore a silicate of magnesia. Here the third constituent, water, furnishes still another distinct name to our compound, and it stands forth with its full cognomen—a hydrated silicate of magnesia.

The percentage composition of Serpentine mineral is theoretically mainly as follows: Silicic acid, 44.14; magnesia, 42.27; water, 12.89. But the natural specimens as they are preserved in our cabinets or analyzed by our chemists, show varying amounts of other ingredients, among which are oxide of iron, alumina, and a little lime, with traces of oxides of nickel, chrome and manganese. Dr. F. A. Genth,* a well known chemist of this city, gives the following as the result of one of his analyses of a specimen of Serpentine from Webster, North Carolina, which may be taken as representative of the composition of the massive mineral:

*American Journal of Science II. xxxiii. 201.

Silicic Acid.....	43.87	per cent.
Alumina.....	0.31	“ “
Protoxide of Iron.	7.17	“ “
Magnesia.....	38.62	“ “
Water.....	9.55	“ “
Oxide Manganese.	a trace	
Oxide of Nickel...	0.27	“ “
Lime.....	0.02	“ “
Chromic Iron.....	0.57	“ “
	100.38	

The variety of the mineral occurring at Lizard Point, Cornwall, England, and known as noble or precious Serpentine, approximates most closely to the theoretical composition of the pure mineral. "It is translucent, of greenish yellow color, and much softer than the darker and more impure varieties, in fact it is but slightly harder than gypsum and may be scratched by calc-spar. It contains about one per cent. of the iron oxides, ferrous and ferric, which are present in much larger proportion in the more richly colored and variegated sorts of Serpentine."*

Practically, however, the different specimens of the mineral from its various localities, present very nearly the same composition, and this too, despite the variations in the outward aspects and properties, for we find it of all shades of green in color, sometimes even brownish red and brownish yellow. These variations in shade are frequently as marked among specimens from the same locality as among those from different places, and are totally unaccountable for on the suppositious variations in the nature and quantity of the several constituents.

But the spots and streaks, the veins, seams and clouds upon the rock Serpentine, which give the name, not only to the stone, but also to one of its most remarkable and best known localities, Lizard Point, England, are not due to variation in the amount of iron oxides, as is generally supposed and believed, but are traceable to the admixture of other mineral species which go to make up the mineral aggregation we call Serpentine

rocks or Ophiolites. It is true the red spots are most frequently due to the fact that the normal condition of the oxidation of the iron has been changed by extraneous circumstances, in other words has passed from the state of ferrous oxide to that of ferric oxide, whilst the lighter or darker shades of green are due to the original protoxide of iron, or ferrous oxide, remaining in its true condition.

The occurrence of perfectly distinct mineral species in the massive Serpentine is, therefore, the main cause of its greatly varied aspect. Among such intruding minerals may be cited, diallage, steatite or soapstone, magnesite or carbonate of magnesia, calcite or carbonate of lime, and dolomite or magnesian calcite. These minerals, with the exception of the first named, are most commonly white, and usually occur in undulating layers or seams, sometimes as thin as paper and rarely up to a foot in thickness, which appear on the surface as veins which are contorted and twisted in a manner not unlike the contortions and plications of a serpent, and hence the name. Sometimes however these minerals have a pinkish tinge, more especially the calcite and the steatite, adding still greater variety to the appearance of the stone. Particularly is this true of the steatite in the Lizard stone, according to Prof. Church, from whom we have already cited a description of the nobler variety of Serpentine from the same locality. The mineral diallage not infrequently shows itself as dark metallic looking crystals, and imparts a much prized and great richness to the appearance of the rock. This peculiarity, for it is by no means common, is markedly noticeable in the Serpentine from Vervan and Manacles.

Chromic iron, given as a constituent by the analysts of Serpentine, probably occurs disseminated in the form of minute grains or crystals throughout most masses of the rock. At places it becomes concentrated into larger or smaller irregular deposits, which are

* Prof. Church in *London Student*.

wrought to supply the crude material, for the manufacture of the chromium compounds of commerce. In the decomposition of the rocky masses this mineral, not readily acted upon and not subject to alteration, is removed and transported by currents of water and deposited, giving rise to deposits of sand or stream chrome. The Serpentine deposits of eastern Pennsylvania and of Maryland, are charged throughout their whole extent with this chromic iron, and probably supply by far the largest proportion of the same to be found in the world's markets. Disseminated in small, black, brilliant spots or grains, it serves to give richness in variety to the stone for constructive purposes and for those of ornamentation.

So, also, the frequently occurring magnetic iron has a similar effect on the appearance of Serpentine, though this mineral, chemically and mineralogically related to the previous one, is by no means as unobjectionable, as we will see in that portion of our paper devoted to the consideration of the durability of Serpentine, and the cause of its frequent rapid weathering. Oxide of nickel is not, as a general thing, a component of the ophiolitic rocks of Pennsylvania, Canada, New Jersey and Massachusetts, though it is found, in amount ranging from two-tenths of one per cent., to upwards of two per cent., in the specimens from Saxony, from Cornwall, from the Green Mountains of Vermont, from Connecticut. Its general effect, when present in the somewhat larger quantities in which it has been noticed, is to increase the intensity of the green shade, and to cause it to border more on the emerald tint.

Thus much for the mineralogical and chemical composition of Serpentine. It is impossible to convey, by written description, any adequate idea of the exquisite and intricate beauties, tracings and shadings of structure and color, which variation of arrangement of these compounds may bring about. And some

of the finest of natural views are those to which the contour and variations of the Serpentine rocks, as they appear naked and divested of the covering of Nature's foliage, give their peculiar character. Professor Church, thus describes a view into which our rock enters as an important element: "The Serpentine of the Lizard district occupies a rather limited extent of country. On the coast west of the Lizard Head, we may specially note its occurrence at Mullion, Pradainack and Kynance. The exquisite beauty of the coast at Kynance cove is a matter of notoriety. The clear sea, a chrome green, here and there darkening with violet, and edged and flecked with foaming white; bright sand streaked with lines of Serpentine pebbles; and, above all, cliffs and islands, and cavernous, recesses varied in form and splendid in color, all these things, with the charms of varied atmosphere, and the rare heaths, clover, ferns and other plants, make Kynance, which neither words nor colors can adequately represent, or even recall."* Such landscapes are measurably peculiar to Serpentine localities, for it must be known that rocks impress a physiognomy peculiar to their own kind on the configuration and outline of a country, and that they react upon and determine to a great extent the conditions of agriculture and industry.

Serpentine has a peculiar sub-resinous or greasy lustre, and is soapy and unctuous to the feel. It is at once tough and yet easily wrought, and takes a good polish. It may be turned in a lathe, being worked by such means into ornaments, vases, etc. Several hundred persons find employment at this kind of labor, in the production of ornaments, at Zobnitz, in Saxony, Bayreuth, and in Franconia. The so-called "Verd Antique Marble," familiar to us, is a variety of our rock which gives the best notions of its susceptibility to polish, and its adaptability to purposes of ornamentation. The use of the polished specimens

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are necessarily limited to in-door work, since exposure to the weather causes the various mineral species to wear unevenly, owing to their unequal hardness, and thereby to lose the much prized and factitious lustre.

When first removed from its bed or deposit, the stone is wrought with much greater readiness and facility, but as it parts with its "quarry water" it becomes harder, and though still working with facility under the chisel, when compared with many other varieties of rock, requires greater labor than at first. Doubtless this change is due to certain silicates and other mineral compounds held in solution by the water, crystalizing out, and rendering the stone thereby much harder as the water is lost through evaporation or otherwise. A large proportion of foreign constituents in the rock renders the stone difficult to dress, causing it to become brittle and easily broken under the hammer, while a considerable amount of magnetic or chromic iron will injure the stone-dressers tools, made the surface of the prepared stone irregular, and mar the general and pleasing effect of the natural lustre. These foreign materials have also an important bearing on the durability of the stone. While the silicate of magnesia, though it be associated with more or less of the coloring ferrous oxide—also existing as a silicate—will be but slowly changed by exposure to the weather, some of the intermingled silicates, especially those of complex constitution, will rapidly decompose under the influence and in the presence of meteoric and drainage waters charged with carbonic acid. The magnetic iron has also a tendency to become rapidly oxidized, and to pass into the condition of a brown hematite or hydrated ferric oxide which, increasing in volume under such a change, serves mechanically to disintegrate the stone. The surface or out-cropping edges of any Serpentine deposit in which this mineral is abundant, will testify to the destructive effects of

such a chemical change. The calcite and magnesite are not subject in any marked or note-worthy degree to decomposition, so that in the aggregate, Serpentine may be fairly assumed as being but little prone to disintegrate from chemical changes in the composition of its component minerals. Being also compact and close-grained, there is but little opportunity of mechanical disintegration resulting from repeated and alternate freezings and thawings of absorbed water.

Its durability being thus established on theoretical grounds, let us see how our view is borne out by practical experience. Near the banks of the Brandywine, a short distance above the battle field of Chadd's Ford, stands an old building—a Friends' meeting-house—which antedates the revolutionary war, and which has not a few historical associations of that interesting period clustering around it. It is the old "Birmingham meeting-house," the scene of some sanguinary conflict, in whose quiet shaded yard are buried many a victim of the bloody days of Brandywine, and whose floor is still stained with the life-blood of both contending parties. This historically interesting building is partly constructed of Serpentine, from a neighboring quarry. A careful inspection of its aged walls will show but little weathering of this rock; no disintegration, no scaling, simply, and only a dimness of lustre, while its associates—granites and gneiss—are witnesses to the age of the building, and to the severity of a changeable climate. So also in the immediate vicinity of this historic building, and elsewhere throughout Chester and Delaware counties, are many farm houses, built of the local Serpentine rocks which testify, in a strong manner, to the durability of such stone. Practical experience in this respect co-ordinates and supports, to a most remarkable degree, the theoretical considerations we have noticed above, from the chemical composition and physical properties of the

minerals aggregating themselves to form Serpentine. As the appearance of the stone is much in its favor, and renders it a desirable acquisition to the list of building materials, it is well to have so strongly substantiated its excellence with regard to durability. There is also this useful lesson to be derived from this agreement between observed practical results and mere laboratory or office considerations: That an attentive examination of the nature of the minerals, entering into a rock as components, and a consideration of the arrangement of the same, would frequently save future expense and outlay, by guiding in the selection of proper stones for constructive purposes. In other words, that a knowledge of mineralogy is a most desirable acquisition to those having the selection of building materials, and this we will have occasion to demonstrate and to insist upon in almost all the articles on the subject we have chosen.

Serpentine most probably belongs to the class of igneous or fire-born rocks, unless, indeed, one accepts the rapidly gaining views of the ultra-neptunists of the Bischoff school of geology. It is, however, of all geologic ages, that is, it may be found occurring associated with the rocks of any of the geologists periods. In Pennsylvania it forms a series of belts of greater or less width, entering the State near Easton and re-appearing at intervals throughout Bucks, Montgomery, Delaware, Chester and Lancaster counties, sending off numerous spurs, and with several outlying deposits, and giving to the sections in which it comes surfaceward, anything but a desirable character for agricultural purposes. The north-eastern prolongation of this general strike of the formation, is through the northern part of New Jersey, entering New York opposite Hoboken, and appearing at intervals into Connecticut. South westerly, it appears in Maryland and has a southern prolongation into Virginia. It is not claimed, nor is it to be understood,

that these deposits are all of the same geologic age, or that they are continuous. The line of the principal deposits has this general trend, but there are others as in Vermont, and Canada, which are most probably of an earlier geologic epoch. The various deposits have obtained considerable importance at various localities for the economically useful minerals locked up in them, rather than from any great extent to which the rocks from them have been employed for purposes of construction. Chromic iron is extensively mined, more especially in Pennsylvania, and the magnesite and other readily decomposable magnesian minerals, are sources of that base for the preparation of epsom salts and other magnesian compounds.

In Delaware county, about fifteen miles distant from Philadelphia, occurs a spur of the main deposit, which has already furnished some handsome stone for buildings in the city. It reaches its place of main consumption over the line of the Westchester Railroad, and has this advantage of short transportation. Probably the deposit most interesting to the geologist and mineralogist, as well as to the builder, is that in the neighborhood of the old Birmingham meeting-house, Chester county, from which was taken the material for the "old building," as well as for the more modern and pretentious, Beth-Eden Church, at the northwest corner of Broad and Spruce streets, Philadelphia. This deposit appears in the form of an isolated knob of elliptical form, the major axis of the ellipse having a general east and west direction, and being marked by a granitic or rather protogine intrusion, which has elevated the knob to a maximum elevation of about one hundred feet above the stream at its base. The hill covers an area of about six acres, thus furnishing a very considerable mass of stone which can be economically quarried, possessing the advantageous topographical features of considerable height above the drainage

level of the district. The line of the granitic intrusion is marked on either side by an occurrence of soapstone which separates it from the Serpentine, and which has doubtless resulted from the action of the former on the latter. Magnetite or magnetic iron is quite abundant, but is not disseminated through the mass of the Serpentine, but segregated into veins, some of which may eventually prove to be of considerable economic importance. This accumulation of the iron into veins is advantageous, from reasons above stated, to the quality of the stone, since it does not interpenetrate the whole deposit, and permits of furnishing blocks of very considerable size throughout, which hardly a speck of the somewhat obnoxious magnetite is discernable.

The prevailing color of the stone from this quarry is a light cheerful green; its texture is very uniform and firm, and the

quarry furnishes by far the finest dimension stone of any it has been our fortune to examine. It is dressed on the ground by exceedingly ingenious machinery, which is capable of cutting it also into neat ornamental designs of moulding, etc.

Such are the chemical composition, the minerological constituents, and the physical proprieties of this interesting and valuable rock. Its recent introduction into Philadelphia has met with considerable favor, and its employment for both public and private edifices is rapidly extending. Its cheerful appearance and beautiful tint will do much to relieve that sombreness and monotony of buildings, for which this city has too long been noted, while its durability and the readiness with which it may be procured and be wrought, must commend it to the favorable consideration of architects.

THE COMMISSIONER OF WORKS AND MR. E. M. BARRY.

INSTITUTE OF ARCHITECTS IN IRELAND.

A SPECIAL Council Meeting of the Royal Institute of the Architects of Ireland has been held, to take into consideration the demand made by the Chief Commissioner of Works for delivery of plans. A statement was addressed to the council of the Royal Institute of British Architects, expressing strong sympathy and interest in Mr. Barry's case by the members of the profession in Ireland, and the anxiety of the Irish Institute to co-operate with their English brethren in resistance to this, or any other encroachment on a uniformity of practice, heretofore by well-established custom existing in the profession on both sides of the Channel. It was further stated that the rule of the Irish Institute was identical in expression with that of the rule of the Royal Institute of British Architects issued in 1862, having been

adopted in 1863 as *properly and correctly stating the practice and usage of the profession as heretofore existing in Ireland.*

It was further said that claims by clients for the delivery of plans had rarely been made on members of the Institute, and that in a few cases where such claims had been set up, backed by the institution of legal proceedings, such claims had, under the advice of eminent counsel, been resisted, and no further attempt made to prosecute them.

The Hon. Secretary of the Glasgow Architectural Society sends us the following extract from the minutes of a meeting of that society recently held:

"It was resolved to write to the Royal Institute of British Architects, stating that it had been the invariable practice in this district to regard drawings as the

property of the architect, and that this principle is always adhered to in Glasgow.

It is satisfactory to learn that a thorough uniformity of practice prevails among architects both in England, Scot-

land and Ireland; and it would be desirable, that before any re-issue of the scale of charges and statement of practice, a conference should be organized.—*The Builder*.

PLASTERING.

MAKING allowance for the difference of material and treatment, between this country and England, the practical plasterer will find the following account of his calling, as taken from the *Cyclopædia of Art*, worthy of notice, if it were only to mark the distinction between English and American constructive modes and means.

“Plastering is the art of applying adhesive plaster or cement to walls, ceilings, etc., for the purpose of concealing the roughness of brickwork or masonry, or the timber framing of partitions, floors, roofs, and staircases; and also for allowing the application of painting, paper-hanging, or other modes of decoration. It is also the business of the plasterer to form and fix ornamental cornices, center-pieces, and other similar ornaments. Plastering does not contribute to the stability of a structure, but adds greatly to its neatness, elegance, and comfort. Its general introduction is of comparatively recent date, for we still find in houses built only a century ago, wainscoted walls and boarded, or boarded and canvassed ceilings, or joists entirely uncovered.

“In applying plaster to a brick wall, the surface must be made rough and prominent, in order that the plaster may adhere properly. In building a new wall which is to be plastered, the joints are all to be left rough and prominent instead of being *drawn* with the trowel, as is done for exposed brickwork. In old walls, the mortar must be removed to a small depth, as for repointing, and the surface of the brickwork be rough-

ened by *stabbing* or *picking* it over. The surface is then brushed free from dust, wetted with water, and the first coat of plaster applied in a fluid state, with a coarse bristle brush; before this is quite dry a coat of coarse plaster may be added. In plastering upon quarter partitions, or on the under surface of timber floors, an artificial surface is formed for the plaster by nailing narrow slips of wood, named *laths*, to the timber quarterings, or to the joists. Laths are usually of fir, about 1 inch in width, and from 3 to 5 feet in length, and they occur in three thicknesses, viz: $\frac{1}{4}$ of an inch, which is termed *single lath*; $\frac{1}{2}$ of an inch, or *lath and a half*; and $\frac{3}{4}$ of an inch, or *double*. They are formed by splitting or *rending*, not only for economy of wood, but also for roughness of surface, and greater strength and elasticity. They are nailed with cast-iron nails, transversely across the joints, with a narrow slit or opening between every two adjacent laths. It is sometimes necessary to level the under surface of the joists, by attaching slips of wood termed *furrings* or *firrings*, so that the laths may occupy one plane. The laths should also be of uniform thickness, and made to break joint as much as possible; but greater strength is gained by making the ends of the continuous laths meet upon a joist or quartering. The first coat of plaster is called *coarse stuff*, and is a mortar of lime and sand mixed with ox or horse hair, to give it consistency; this is applied with a trowel in such a way as to force the mortar into the narrow openings between the laths.

behind which it sets or hardens, in the form of little swellings or lumps, and thus becomes *keyed*, or secured to the laths very firmly. If two coats only are to be applied to the laths, the plastering is termed *laid and set*; the first coat, or the laying, is levelled with the trowel, and when sufficiently dry, its surface is scratched up or roughed with a birch broom, and a thin coat or *set* of finer plaster is laid on and smoothed with the trowel, with occasional moistening with a bristle brush. The first coat may also require to be sprinkled to promote adhesion. In the better kind of work, where three coats are applied, the first is laid on roughly, and while soft is scored over with a pointed lath, with cross line 3 or 4 inches apart, and as deep as they can be made without laying bare the laths. These lines enable the second coat to adhere more firmly. The first coat may project $\frac{1}{4}$ or $\frac{3}{8}$ of an inch from the laths, and is then called *pricking-up*. When it is become firm by drying, ledges or margins of plaster 6 or 8 inches wide, termed *screeds*, are formed at the angles, and at intervals of a few feet across the surface, and are adjusted to nearly the degree of projection of level of the finished surface, so as to form gauges for the rest of the work. The spaces or bays between the screeds are filled up flush with them, and the plaster levelled by means of flat wooden *floats* (made with one or two handles, those with two handles being termed *derbys*, or *derby-floats*), and *straight-edges*, or long pieces of wood planed to a straight-edge. When the second coat is dry, it is swept over, and a third coat of *fine stuff*, or plaster made with very fine white lime, is applied and well floated until it forms a smooth hard surface. In applying plaster to a brick or stone wall the first rough coat is termed *rendering* instead of *laying*. Ceilings or fine surfaces that are to be whitened or colored, are finished with a fine plaster, made of the best powdered lime, well worked with water into a paste

or *putty*, as it is termed. For surfaces that are to be papered, a stuff a little less fine, mixed with a small proportion of hair, is used. Surfaces intended for painting, are finished or *set* with *bastard stucco*, consisting of two-thirds ordinary fine stuff without hair, and one-third very fine clean sand; the last coat is finished with the trowel without the float.

"The plasterer is attended by a laborer to supply his boards with mortar, and a boy on the scaffold to feed his *hawk*. This is a piece of wood 10 inches square, held by a projecting handle at the bottom, and is adapted to the reception of a small quantity of mortar. The laying-on trowel is a thin plate of hardened iron or steel, 10 inches long, and $2\frac{1}{2}$ wide, rounded at one end, and square at the other end or heel. It is very slightly convex on the face. About the middle of the back the spindle or handle is riveted in at right angles, and this returning in the direction of the heel, parallel to the tool, fits into a rounded wooden handle, by which the workman grasps it. When not in use, this tool must be kept perfectly clean and dry, for if a spot of rust were to form on it, it would stain some of the delicate plasters with which it is used.

"The construction of cornices is also the work of the plasterer. Cornices may be plain or ornamented, or both. If they project more than 7 or 8 inches, *brackets* or pieces of wood must be fixed at distances of 11 or 12 inches all round the site of the intended cornice, and laths be nailed to them; the whole is then covered with a coat of plaster. A beech mould is made by the carpenter with the profile of the intended cornice; the mould is about $\frac{1}{4}$ inch thick with the *quirks* or small sinkings of brass. The plasterer must remove all sharp edges, and open with his knife the points which will not receive the plaster freely. The cornice is then run by two workmen, who are provided with a tub of putty and a supply of plaster-of-Paris. Before using the mould they gage a screed upon

the wall and ceiling of putty and plaster, covering so much of each as will correspond with the top and bottom of the intended cornice. On this screed are nailed one or two slight deal straight-edges adapted to as many notches or chases made in the mould for it to work upon. The putty is mixed with about one-third plaster-of-Paris, and brought to a semi-fluid state with water. With two or three trowelfulls of this composition upon his *hawk*, which he holds in his left hand, he begins with his trowel to plaster over the surface intended for the cornice, while his partner applies the mould to see where more or less is wanted. When a sufficient quantity of plaster has been laid on, the mould is held steadily and firmly to the ceiling and wall, and moved backwards and forwards, the effect of which is to remove the superfluous stuff and leave an exact impression of the mould upon the plaster. In the course of this operation the other workman fills up any deficiencies that may occur with fresh plaster. In this way the work is executed with rapidity; the plaster is sprinkled from time to time with water during the progress of the work, to prevent it from setting too quickly. To secure the correctness of the cornice, it is desirable to finish all lengths or pieces between any two breaks or projections at one time. Cornices of large proportions may require three or four moulds. Internal and external mitres, and small returns or breaks, are modelled and filled up by hand at a subsequent operation. When cornices are to be charged with ornaments, certain projections are made in running the mould, so as to leave a groove or indentation in the cornice into which the ornament is laid, and secured in its place by plaster-of-Paris. These ornaments are cast in plaster-of-Paris from clay models, but of late years other substances, lighter and less liable to injury than plaster, have been used, such as *carver's compo*, consisting of a mixture of whiting, resin, and glue; *papier-maché*,

with a priming of whiting and glue over it, when sharp impressions are required; *carton pierre*, with layers of whiting and glue; and *gutta-percha*. One of the advantages of carver's compo is, that not being brittle, ornaments can be bent about and adjusted while being fixed, or after they are fixed.

"Plasterers' work is measured in feet and inches, and charged by the superficial yard of 9 square feet, according to its quality. Special charges are made for arrises or external angles, quirks, mouldings, and other enrichments and carved work.

"Such are the details of the plasterer's art in England, where the means for making plaster, properly so called, are limited. In other words, this country possesses abundance of carbonate, but very little sulphate of lime; plenty of chalk and limestone, but not much gypsum. In the neighborhood of Paris, on the contrary, where gypsum is abundant, and is extensively burnt into plaster-of-Paris, the art of the plasterer varies with his material. The coarser kinds of plaster are used for ordinary work, such as walls and partitions; the finer kinds being used for ceilings, cornice, etc. For walls, the plaster must be gaged stiff for the first coats, and more fluid for the setting coat. For cornices worked out in the solid, the core is of stiffly-gaged plaster; this is floated with finer material and finished off with plaster of about the consistency of cream. Walls are first joined and wetted with a broom; a coat of thinly-gaged stuff is laid on with a broom, or worked roughly with a trowel. The next coat is gaged stiff, laid on with a trowel, and floated with a rule, but the face is finished with a hand-trowel. The rapidity with which the plaster sets does not allow the surfaces to be so even, or the angles so sharp and so true as with us. The rapid drying is however a great advantage. Walls of this kind are not capable of resisting the action of the water.

"Plaster has much less tenacity than mortar, the one decreasing, and the other increasing with time.

"New walls, or walls in damp places, are apt to generate nitrate of potash, which works its way to the surface, where

its effloresces and carries off that paint in large patches. The workmen calls this the *saltpeter rot* or *saltpetering*. It is not, however, pure saltpeter, for nitrate of soda and chloride of potassium are also found with it."

ANCIENT BASILICAS, OR CHURCHES.

ANCIENT Basilicas were used by the Romans for the transaction of judicial business, an oblong building divided in the direction of its length into a nave, and three aisles, was easily adapted to the christian service. The aisles were set aside for the accommodation of men and women; while in the nave the choir, and the minor clergy found accommodation. The upper part of the Basilica was raised above the level of the other part of the building, by a few steps and there (when such buildings were converted into churches), divine service was performed.

The first Christian Church dates back to the early part of the fourth century; in this church it is said that Constantine was baptized by Pope Sylvester.

When Constantine the Great embraced christianity, he took a great interest in creating and encouraging the building of church edifices to advance the cause which he so heartily espoused. Previous to his conversion, almost all religious places of worship were dedicated to the gods or idols, in which were offered sacrifices to appease the wrath of the offended deities. One of their temples, the Pantheon at Rome, and the only one that has withstood the ravages of time, is at present used for Christian worship, and is the oldest edifice in which christianity is preached. This was one of the most magnificent of the Heathen temples, being built more than two thousand years ago.

This building consists of two distinct proportions, a rectangular portico and a circular body, having a spherical dome

whose diameter within, and its height from the pavement to the eye above, are each, one hundred and forty-four feet; immediately from the top of the attic springs the spherical roof, which was divided by bands crossing each other forming panels. The walls between these bands are a composition of lime and pumice stone, used for the purpose, to lighten the roof. In this building as in all Heathen temples there are no windows, the light being admitted through the eye of the dome, it being sufficient for the purposes of the priests, who alone entered the temple to obtain the oracles from the gods whom they claimed to communicate with.

The portico of this edifice contains two ranges of eight columns, forty-two feet in height, irrespective of base and capital. Each column or shaft is hewn from a single block of marble. The front columns sustain a noble entablature, but the mass of the pediment rests upon arches concealed by the architrave. The interior is decorated with Corinthian columns of rare marble.

In the year 27 B. C., this edifice was dedicated to all the Heathen gods. Now the emblem of the christian hope (the cross), is seen on the apex of the pediment, and the building has been rededicated, not to heathenism, but to christianity, to the Virgin Mary and all the Apostles.

The first Christian Church erected by Constantine the Great, was about the year 306 A. D. on the Coelian Mount. It was a building of no great magnificence and was finally destroyed. At this day only the situation is known.

The next church edifice of importance was that of St. Peter's, which was constructed about the year 324 A. D., upon the site of the Circus of Nero, and the temple of Apollo and Mars, which were destroyed for that purpose. It was divided internally into five aisles from east to west, which terminated at the end in another aisle from north to south, in the center of which was a large nitch or tribunal, giving the whole the form of a cross. The largest aisle was enclosed by forty-eight columns of precious marble, and the lateral aisles had forty-eight columns of smaller dimensions, two columns were placed in each wing of the terminatory aisles. The whole was covered with a flat ceiling, composed of immense beams, which were cased with gilt metal, and Corinthian bases taken from Heathen temples.

A hundred smaller columns ornamented the shrines and chapels. The walls were covered with paintings of religious subjects, and the tribunals were enriched with elaborate Mosaics; an incredible number of lamps illuminated this ancient edifice. For twelve centuries this building was the pride of Rome, but crumbling with age, it was at last pulled down and upon its site, stands the pride of modern Rome (St. Peter's and the Vatican).

After the seat of the Roman Empire, in 327 A. D. was transferred to Constantinople, the Church of St. Sophia was erected by Constantine. This church was built in the Byzantine style of architecture, its form was that of a cross, and built in many respects similar to St. Peter's, it was soon afterwards destroyed, and a new church was commenced under Justinian, about the year 532. The plan of this edifice was a square of about two hundred and fifty feet. The interior forms a Greek cross, the aisles are terminated at two ends by semi-circles, and at the other two by square recesses, in which are placed two ranges of tribunals. The aisles are vaulted and the center where they intersect, forms a large

square upon which is raised a dome of one hundred and fifteen feet in diameter. The dome is supported upon four arches of the naves, and the pendentives which connect the square plan of the center, with the circle of the dome. The dome is illuminated by twenty-four windows, and its lofty center where the cross was placed is one hundred and eighty feet above the pavement.

The materials which support the dome are huge blocks of free stone, and that of the dome pumice stone, which is five times lighter than the ordinary base material used, which was brick, but these were concealed by a veneering of marble. The cupola, the two large and six smaller line domes, the walls, the hundred columns, and the pavements, present a rich and variegated picture.

The balustrade of the choir, the capitals of the pillars, the ornaments of the doors and galleries, were gilt bronze.

The sanctuary contained forty thousand pounds weight of silver, and the holy vases and vestments of the altar were the purest gold, enriched with inestimable gems. All these with many other ornaments delight the eye of those who look upon them, and produce feelings of wonder when they think of the hands that constructed them. A crescent now occupies the place where the cross was once erected, and this splendid edifice is now a Turkish Mosque.

Anthemius formed the design, and his genius directed the hands of ten thousand workmen for the space of five years, eleven months and ten days. When it was dedicated, Justinian with devout vanity exclaimed, "I have vanquished thee, O Solomon!" After twenty years St. Sophia was visited by an earthquake which destroyed the eastern part of the dome. Its splendor was again restored by the same Prince, and remains to-day a stately monument of his fame.

The Church of the Nativity was erected by Helena, over the cave in which Christ is said to have been born, about 327 A. D., it has undergone many

changes since its first erection. It is about one hundred and twenty feet long by one hundred and ten feet broad. The roof is built of wood; the naked beams are rough frame-work supporting it, and is left on the inside uncovered, giving it a very unfinished appearance. This roof is supported by forty-eight Corinthian columns, arranged in four rows of twelve columns each. These columns are each of one single piece of stone, two and a half feet in diameter, and more than twenty feet high, and are supposed to have been taken from some ancient temple.

This church is divided into several departments, in one of these is situated an altar, said to mark the spot where the innocents slain by Herod were buried. In another apartment was an altar, beneath it, raised a little above the floor is a marble slab, on the center of the slab is a large silver star, eighteen inches in diameter, on which is engraved in Latin, "Here Jesus Christ was born of the Virgin Mary." The chapel is richly embellished with gold and silver ornaments and pictures. This church has been made a place of pilgrimage for many centuries.

The church of the Holy Sepulchre was built by Constantine, on the spot where stood a Pagan Temple. It was completed about the year 335, A. D., and stood two hundred and seventy-nine years. In 614, A. D., it was entirely destroyed. Sixteen years afterwards, it was rebuilt upon a larger scale. A spacious rotunda, with a large dome supported upon twelve massive columns, was built around and over the sepulchre, the columns representing the twelve Apostles, standing around the tomb of their Master. This building was demolished in 1048, in 1099 the Crusaders rebuilt, remodeled, and enriched it. In this condition it remained until 1808, when it was destroyed by fire. Phœnix like, the majestic dome again rose from the ashes of its former ruin, and the

church, as it now stands was dedicated in 1810. This spot has been the scene of contention for centuries between Mohammedan, Christian and Jew, each anxious to possess it. At present it is held by the Turks, in which they tolerate different forms of worship around the Holy Sepulchre, and keep a guard of soldiers to prevent the devotees from killing each other.

St. Mark's, at Venice, was erected about 979, A. D. This splendid edifice is built entirely of precious marbles, brought from the Orient; nothing in its composition is domestic. It is built in the Byzantine style of architecture, being surmounted with five domes. The interior contains five hundred curious columns.

"The atrium whose rounded vault presents in Mosaics, the history of the Old Testament, leads to the nave by three bronze gates, ornamented with silver, which it is said belonged originally to St. Sophia.

"Let us enter," says an observer, "into the interior. Nothing can compare with St. Mark's, neither Cologne nor Strasburg, nor Seville, nor even Cordova, with its Mosque. Its effect is surprising, even magical. The first impression conveyed is that of a cavern of gold, encrusted with precious stones, which are at once splendid and sombre, sparkling with mysteries."

"Cupolas, vaults, architraves, and walls, are covered with little cubes of gilt crystal, of unique form, among which the rays of light sparkle, like the scales of a fish. Where the gold terminates at the height of the columns, commences a clothing of most precious and varied marbles. From the vault descends a great lamp in the shape of a cross, of four branches, whose points are decorated with lilies, and which hang from a ball of gold filigree. The effect is marvellous when the lamps are illuminated. Six pillars of alabaster, with capitals in bronze-gilt of Corinthian pattern, support elegant arcades, around

which runs a gallery the whole length of the church."

Under the altar it is said repose the ashes of St. Mark. This building has

stood the ravages of a thousand years, which the wearing away of the stone indicates from its almost shapeless form.

B. S. DEF.

TIMBERS FIT FOR THE CARPENTER.

IN general, regularity in the roundness, and the taper, of a tree, and a fine or uniform texture in the bark, indicate it to be of good quality.

All appearance of knots, wens, swellings old sores, although cicatrized, all traces of canker, or of water having reached the heart of the tree, are infallible signs of diseased wood. Fresh mosses and lichens on a tree which has been some time felled, are symptomatic of its having lain in a wet place. These may also indicate the locality of some internal disease.

It requires a practised eye to judge of the qualities of timber while yet in the unbarked tree; but, as the carpenter generally receives the wood on which he operates, squared, this knowledge is not of so much importance to him as it is to the timber merchant.

The qualities which fit wood for works of carpentry are durability, uniformity of substance, straightness of fibre, and elasticity. When wood is squared, its good quality, especially in the case of the oak, the chestnut, and the elm, is known by a fresh and agreeable odor which it exhales, and which is very different from the smell of wood, however freshly cut, which has begun to decay. When timber has been felled for a long time, and has become dry, this peculiar odor is not so perceptible, but the resinous trees retain the smell of the resin for a very long time; the odor being again made perceptible by cutting a slice from the surface. Dry and healthy timber is solid, tenacious, sonorous, and elastic; when it is dead or diseased, it is soft, emits a dull sound when struck, and acquires a disagreeable smell.

The good quality of wood is known also by the uniformity and depth of the color peculiar to its species. When the color varies much from the heart to the circumference, and, above all, when it lightens suddenly or too rapidly towards the limit of the alburnum, we may be assured that the tree is affected by some disease.

The white wood or alburnum of trees should be rejected; and where there is a double layer of white wood, separated by a layer of perfect wood, as is sometimes though rarely the case, the wood is unfit for use.

Knotty and cross-grained wood is difficult to work. Cross-grained wood is rarely of great dimensions, and is employed chiefly in the construction of machines, and for purposes in which the tenacity of its fibres is its recommendation. It is rejected for ordinary work, because it is difficult, and, consequently, expensive to work, and weighs heavy in proportion to its strength. Such timber is very often, however, employed in hydraulic works, especially when it is to be wholly under water. It is apt to become shaky diagonally in drying.

A great defect is when the fibres do not approach to equality of size. Perfect equality is impossible in tapering timber, but such an equality as shall not render one part of the piece of timber much less strong than another is obtainable by proper selection.

In knotty wood, the knots interrupt that straightness of the fibres which give strength. The knots are the prolongations of the branches across the perfect wood of the tree from the points where the branches have commenced. Such

knots augment in size in the degree that the trunk of the tree increases. If the branches have grown with the tree to the time of its being felled, the knots will be perfect wood, the fibres of the trunk will only be turned slightly from their straightness, and if the knots are few they will not be very hurtful. But if the branch forming the knot has been suppressed or destroyed, or has by any cause ceased growing while the tree grew, the knot formed by it will be inclosed in the new layers of wood, and may become a cause of destruction by the decaying of its substance from contained moisture, and thus a nidus of rottenness is formed within the tree. It is therefore prudent to probe knots, and, if they are decayed, to cut off all the wood which is traversed by them. In general, the prevalence of knots in a piece of wood indicates that it has been cut from a branch and not from the trunk of a tree.

Wood which in growing has been blighted by frost is not fit for the carpenter. The lateral cohesion of its fibres is destroyed, and it contains numerous little chaps which absorb moisture and cause it to rot.

When timber in growing has been subjected to strong frosts and thaws, the wood is often alternately alive and dead, and filled with small clefts. It is recognized by an appearance of marbeling which it presents on being cut.

Krafft, in the introduction to his *Carpentry*, has the following remarks: "It is important," he says, "in the employment of timber, in pieces used vertically, to place them with the butt on high, and the top downwards. To know if a piece of timber is sound in the middle, saw its two ends, then cause blows with a hammer to be struck at one end, while the ear is placed against the other; and if the sound is dull the timber is bad; but if, on the contrary, it is clear, the timber is good."

Generally when the tree is sound the density decreases from the butt upwards,

and from the center to the circumference. The greatest strength is found between the center of the tree and the sap-wood; and the heaviest wood is the strongest.

Sound wood under the saw cuts clean, is bright in color, and, when planed, has a silky lustre; unsound timber wants this lustre, and the saw leaves a wooly surface.

CHINESE HOUSE-BUILDING.

WHEN a missionary arrives at his station the first care is to secure a house. Suitable premises can be rented of the Chinese for about \$150 a year. It is necessary to rent about twenty-five rooms, as there will be servants and animals to provide for. The inner court, which is apportioned to the family, is usually tile-roofed. A Chinese house is built around an open square, or court. The sides of the rooms facing the court are filled with windows, which are made by pasting paper over a frame-work of wood. The light and air comes from these sides only. Security and seclusion are gained by this mode of building. One great gate gives entrance to the premises.

In fitting up a house for our use the principal repairs are removing kangs, putting in board floors, and suitable doors and windows. The kang is the brick stove-bed, having air passages through it, and heated in winter. It serves as a bed by night and a seat by day, and thus protects the feet from the cold brick floor. The kangs are taken away and floors laid. Doors of a foreign pattern replace the two-leave, ill-fitting Chinese ones. A few glass windows are substituted for paper ones, then the work is done. The lumber used here is pine, brought from Klachta, Siberia, across the desert of Gobi. It is carried on camels, and comes in beams of eight feet in length.

A Chinese carpenter's tools are rude compared with ours. The saw is set in a frame like that of a wood-saw, and is so unwieldy that two men are required

in using it. The hatchet is a clumsy thing. Augers are unknown, but small holes are rapidly made by a drill, which revolves backward and forward by means of a stick and strap. The nails are of wrought iron, and must have holes bored for them. They wonder how our nails can be driven in without splitting a board. Screws are never used. In putting on door-locks you must overlook the work for the first few times.

Mud mixed with straw is used for the roof and walls of all except the best houses.

A town thus built presents a mean appearance. Baskets, one on each end of a pole, are used for carrying bricks. Mortar is carried in a cloth, gathered up at the corners. I have seen a novel way of tending the mason when the wall was high, so as to be out of reach. The shovel, with the mud on it, was pitched up and caught skilfully by the mason. The hod, which Paddy uses so much at home, is unknown in China. Houses are rarely above one story in height.

I have found the paper-hangers, above all other workmen, thievish. When you are convinced of a man's dishonesty, no remedy exists but to dismiss him at the end of the day, for it is almost impossible to detect a Chinaman in pilfering, or make him confess that he has done so.

Workmen get fifteen cents per day. One would think the wages very small, but when he sees how little they do in a day, all such thoughts vanish. There is no need of an eight, or even six hours' movement among the Chinese workmen when you hire them. They take about three hours nooning, and a great deal of the working time is spent in drinking tea and smoking. No boy above fifteen is seen without his pipe and tobacco-pouch.

Perhaps some of the inefficiency of the Chinese laborer is to be charged to poor food, but it is also owing to the fact that he has no Sabbath. Except a few days at New Year's, and an occasional holiday, he must drudge on without any day of rest. Truly, the Sabbath is the friend of the working man.

FIRE-PROOF BUILDINGS.

THE following letter addressed to the *Chicago Real Estate and Building Journal*, by Mr. G. Zucker, Architect, of that city, is so much to the purpose and so suggestive on a subject in which the whole country is interested, that we take the liberty of transferring it to our pages. If architects generally would be less selfish of their thoughts, what an amount of good would be derived by the public from such unreserved information as that which Mr. Zucker gives us.

"Sometime ago there appeared in your paper an article concerning fire-proof buildings, which leads me to express a few suggestions, to make our dwellings, stores and warehouses as far as possible fire-proof.

I believe in iron for girders and joists, as the material best adapted to support

and carry a floor for the purpose of making it fire-proof. The only question is, what material shall be used for filling in between. We have the four-mech brick arching, and the corrugated iron covered with cement; but these add too much weight, and consequently require stronger iron joists and girders. Then we have hollow pots to form an arch with, a material difficult to work with, on account of the inequality of widths between the joists.

Now is to be considered the under side of the ceiling. In either of the aboved named cases the joists remain visible; also the arches between—an appearance not suitable for a dwelling nor for offices. For, to remedy this evil, we either have to use the patent of a Louisville, Ky., firm, putting in an iron pan-

eled ceiling, or to make a straight ceiling by furring and lathing, which will admit of paneling and frescoing. As the furring and lathing would be, in a dwelling house or a building containing offices, of no considerable objection, I suggest the following plan:

"First, lay iron girders, or where those are not required, lay iron joists six, eight or ten feet apart, all as the weight, which each floor is intended to carry, requires (the distance of course will determine the depth of the joists), and then fill in between the joists with galvanized iron hollow cylinders, like stove pipes, laid close together. The diameter of those pipes to be determined by the distance of the joists. The ends of those pipes, resting on joists, are to be stiffened by vertical iron braces, to prevent the pipe from bulging in. Hang down every twelve or sixteen inches apart, to suit cross-furring, strong wires between those pipes, to receive and fasten to said cross-

furring to which to lath and plaster. Then cover the top with one inch concrete, filling in properly between, which will hold every pipe in its place; put two by four inch wooden pieces on top and nail the flooring to it; or if tiling is preferred for flooring, lay the tiles on top of the concrete. In the latter case, the diameter of the pipes must be that of the depth of the iron joists. The merits of this plan consist in the following:

"FIRST. It takes away the weight to a considerable extent, which is unavoidable when using brick pottery or corrugated iron filled with concrete.

"SECOND. It admits of a hollow space between ceiling and floor, inaccessible by fire, at the same time admitting the use of those pipes as ventilators.

"THIRD. It admits of a straight ceiling, adapted for any kind of building to be ornamented and painted."

THE LARGEST HOTEL IN THE WORLD.

IF this country has made itself more remarkable in one thing than another it is in the size and magnificence of its hotels; and one would suppose that this species of ambition had been carried to its full height, in the mammoth and palatial structures which our cities in all parts of the compass, display to the wondering gaze of the traveller from Europe. But it is not in the nature of the Yankee mind to be content; the cry is still—"Excelsior." It is not to the cities alone that these vast hostleries are confined; what appears most singular is that some of the very largest are actually tenanted only half the year. Thus, at Niagara Falls the hotel accommodation is on a great scale. But it is only for five or six months occupation. In winter all is silent and deserted as a city of the dead.

SARATOGA has now the lead in this struggle for hotel greatness in its new

grand Union Hotel, which is, beyond all question, the largest in the world.

Its length is four hundred and fifty feet on Broadway, and eight hundred and thirty feet on Congress street. The total frontage being, therefore, one thousand two hundred and eighty feet. It contains eight hundred and twenty-four rooms, and will accommodate one thousand seven hundred guests. The number of its windows is one thousand eight hundred and ninety; and of its doors, one thousand four hundred and seventy-four. The carpeting in use would cover twelve acres; and it has one acre of marble tiling. The aggregate length of its halls is two miles.

This vast structure has for its building materials, brick, stone and iron. Its foundations are twenty feet below the surface of the ground. It has grand piazzas and second story balconies; and to crown this lofty and extensive pile, it

is covered with a Mansard roof, pierced with handsome dormer windows. Yet, it seems of moderate height, being in just proportion. The interior arrangement with its tasteful fitting up, is worthy of the exterior. The dining-room is two hundred and sixty feet long, by sixty wide, and will conveniently dine eight hundred people. The grand parlor surpasses in richness anything yet attempted in such apartments; the mirrors alone costing \$30,000. But, shades of our puritan Pilgrim Fathers! The *Throne-Room* is one hundred feet long, exquisitely frescoed and carpeted with velvet. All the furniture to match

in gorgeonsness. An elevator driven by steam carries the inmates to the upper floors, where sleeping rooms and chambers *en suite* will invite repose with all the elegancies of art surroundings. And amid all of these rooms not a single dark one will be found. Three hundred and sixty well trained attendants wait upon the guests, and all that oriental ease could wish for or obtain, may here be had; aye, even in this watering place hotel of our simple republic.

The estimate cost of the unfurnished building is \$850,000. And a million will scarcely exceed the total outlay on this imperial carivansary.

BALLOON BUILDING.

WE have more than once been asked to describe that simplest, most economic, and yet highly useful mode of wooden construction called "balloon building," and as we know that such information is in very general demand in large sections of the country, we will cheerfully comply with the request.

Where pine forests abound, and saw-mills are convenient, the "balloon" is perhaps one of the best methods of ready house construction to be found, requiring no higher skill than that usually possessed by the country carpenter. But, even in the suburbs of cities these balloon frames are often desirable, and are capable of receiving much tasteful embellishment. Their construction too, often calls forth invention notwithstanding their simplicity.

We now proceed to describe this method:

Having fixed upon the site and position of the intended erection, stake out the location of the walls according to the plan, and if there is to be a cellar, let it be dug out (say five feet deep), and the bottom leveled, digging out the trenches for the foundations below this bottom. As the building will be very

light, it will not be necessary to have the walls thicker than twelve inches. They must be carried up two feet above the surface of the ground, and have sufficient openings for ventilation in the form of windows.

If, however, there are to be no foundation walls, it will only be necessary to set down six foot oak or cedar piles; say of six or eight inches diameter, pointed at the ends, and spaced about five feet apart from center to center. Cut these off even on the top, and level throughout.

On these piles set a framed sill of white oak, pine, or hemlock, six inches wide by eight inches deep. The dimensions may be less than this, but it is a great object to have a stiff first floor. Notch these sill-timbers into each other at the corners, and secure them with square oak pins driven into round holes. Nothing can be lighter.

On this framed sill-work set the flooring joists two by ten each, and twelve inches apart from center to center. When they are all in place and perfectly level, nail on the first line of flooring boards across them and next to the walls. Then proceed to brace them

together, in two or three rows of bridging, called "herring bone;" that is every two sticks crossing each other in the form of an X. The short sticks forming this bridging should be, say two inches by an inch and a half, stoutly nailed alternately to the upper and lower sides of each pair of joists. This renders the floor very stiff and incapable of springing; and consequently makes the walls the more secure.

The flooring may now be all laid down, and the ends of the joists squared off, on a line with the outside of the sills. The next operation being to frame the capping in a similar manner to that in which the sill-frame was put together, and hoist it to its place by raising the four corners at once. Then spike or nail on two flooring boards at right-angles to each other at each corner.

Or, to render this operation still easier, hoist the two side cap-pieces only, and nail on a few boards from sill to cap, tacking on diagonal stay-pieces from the floor to keep them in place while putting up the cross-cap; and notching or halving them down on the former. The joists of the second floor, two by eight, may now be laid from side to side, and be spiked on to the caps. They should be twelve inches from center to center, and have two rows of herring-bone bridging, similar to the first floor. The siding or walling may now be put on in this manner. Use unplanned pine or hemlock boards, nail them to the sill below, and the cap above, all around. Saw out for the doors and windows. Now, take clean well dressed pine flooring and nail it on vertically over the rough siding, taking care to cover the joints in the latter and close in all tight tongue and groove. Next insert the window and door frames; and then proceed to batten over the vertical joints with battens, two and a half inches wide and an inch and a quarter thick, champhered off on the outer edges. The plinth or base-board should be previously nailed on; and as it is beveled off on the upper

edge the vertical battens will be similarly beveled on the under side to fit on to it. The mouldings around windows and doors will also be nailed on before the battens are placed. The roof we will suppose to be a Mansard, as that form gives so much more room than any other, and adds so much to the appearance of even a small dwelling. The heels of the rafters will be cut so as to give a moderate inclination to the sides of the roof, and will be nailed to a framed kerb, spiked on the second floor, and also nailed to a similar but smaller kerb above. These rafters, or, more properly ribs, may be continued all around, and be set sixteen inches from center to center, so as to be easily lathed on the inside. The cover or roof of this Mansard, may be flat and like the sides, be boarded over, or it may rise in the center and have four hips, which is better, as affording a chance to carry off the rain-water, or melted snow. Open spaces should be left for dormer windows. These must be set perpendicularly, and be covered with pediment roofs. The sides and top of the Mansard should be first sheathed with pine or hemlock boards undressed. The sides should then be clap-boarded in the ordinary way, and the roof or cover, be boarded over with flooring stuff and coated with tarred felt, or brown paper and sanded. A light moulding should ornament the upper kerb, which has all around the cover a drain with a current or inclination to one corner; from whence it might discharge rain-water into a pipe in connection with the spout.

The sides of the Mansard might be advantageously covered with shingles, some rows of which might have their corners squared off or rounded, besides being tinted some pleasing color.

We have thus far described the balloon house as far as the outside is concerned. We will now describe the inside.

The first sheathing of rough boards which the walls received, shows on the inside, and its vertical joints are to be

battened over with furring pieces or slips, at sixteen inches apart from centers; and on these the lathing is to be nailed. All the rest of the work, as far as the balloon mode of building is concerned, is not at all different from that practiced in other forms of construction.

Those who have no experience of these balloon houses, may suppose that they must be weak on account of the total absence of all studs, ties, braces, and other framing timbers, but such is not the case; on the contrary, this balloon building is very compact, stiff, and durable, and if there be laid between the rough sheathing and the dress lumber of the outside coat, a covering of strong brown paper, felt, or other like material, there need be no doubt of the warmth of such houses, and moreover there is no wall-space, as in the case of frame houses, wherein vermin can find a ready abiding place. We have seen some of these balloon constructions so very economically built, that a row of a dozen one story cottages had no plastering except upon the ceilings. The walls were only one thickness of board, that is, one inch; the vertical joints were slatted or battened over only on the outside, and the walls were, on the inside, merely covered with wall-papering on the boards! These, of course, were miserably cold in the winter, and not over cool in summer. The shrinkage of the boards composing the walls split the wall-papering, and rendered the appearance of the interior as unpleasing as its defencelessness against the weather was uncomfortable. There is no true economy in such meagre construction, as was distinctly proved in the matter of these cottages. For, no one could occupy them the year round; and so the rental lost by this stinginess of wall building, greatly over-balanced the cost of material and labor for rough sheathing these walls, furring them on the inside, and lathing and plastering them as we have described.

As balloon buildings are only constructed when cheap lumber is available, we will add to our suggestions the very advantageous mode of under laying the flooring. That is, to cover over the joists with rough lumber (hemlock), and on this to lay the finished flooring. Such a proceeding will ensure a tight and warm floor, free from the evil effects of shrinkage. It will, moreover, stiffen the building and prevent that jarring which so tends to loosen the hold of nails, and eventually to start the boards. If paper or felting be laid between these two floorings, the effect of *drafting* will be perfectly secured.

As warmth in winter is the grand desideratum, great care must be taken in enclosing the base, whether there is to be a cellar or not, by carefully boarding up the open interval between the surface of the ground and the sill of the house, and banking up against it as broadly as possible, say three feet, gently sloping the outside and neatly sodding it. This will form a nice little raised walk around the house, if levelled off on the top and covered with ground cinders pressed down and two coated.

But, as ventilation is imperatively necessary to the space under the house, whether there is a cellar or not, boxed opes must be inserted, running horizontally through this embankment. These should have a wire-work grating on the outside, and be made in all respects useful as ventilators, and at the same time preventive of any such annoyance as the harboring of animals.

If there is not to be a cellar under the house, it would be desirable to build one in the rear, near the kitchen. It should be four feet below the surface, and three feet above it, banked up and sodded. It may be constructed of hemlock plank in double sheeting, kept two inches apart, by the intervention of slats, and for coolness should have a tiled floor set in cement. The roof may be round and be double sheeted, with two inch interspace, similar to the walls. The cap

and sill of the door should be each extended to the walls, to act as braces against the corner-posts. Similar braces should be applied to the rear; and the horizontal supports for the shelves should likewise be made available for the same purpose. A square box flue passed through the roof, covered on top, and having open louvres on four sides,

would be required for ventilating purposes.

The entrance should be by a flight of six steps of two inch oak treads without risers, securely spiked into stringers. There should be a door in the cellar and inclined trap-door in the bank, at the entrance to steps. This we believe completes the house and cellar.

COLOR APPLIED TO DOMESTIC ARCHITECTURE.

THE different sentiments of mankind with regard to beauty of colors are inconsistent with the opinion, that such qualities are beautiful in themselves. It is impossible to infer, because one particular color is beautiful in one country that it will also be beautiful in another; now this immediately concerns us; for there are, in fact, many instances where the same color produces very different opinions of beauty in the minds of different races of people. Black to us is in general an unpleasant color; in Spain and in Venice it is otherwise. Yellow is to us, at least in dress, a disagreeable color; in China it is the favorite color. White to us is extremely beautiful; in China, on the contrary, it is extremely disagreeable. If we inquire on the other hand, what is the reason of this difference of opinion, we shall uniformly find, that it arises from the different associations which these different people have with such colors; and that their opinion of beauty is permanently regulated by the nature of the qualities of which they are expressive. Black is to us an unpleasant color, because it is the color appropriated to mourning; in Venice and Spain it is the color which distinguishes the dress of the great. Yellow is in China the imperial color, and sacred to the emperor and his property; it is therefore there associated with ideas of magnificence and royalty. Among us it has no distinct associations, and is therefore beautiful or otherwise, only

according to its degree of shade. White is beautiful to us in a supreme degree, as emblematical both of innocence and cheerfulness; in China, on the other hand, it is the color appropriated to mourning, and consequently very far from being generally beautiful. In the same manner wherever any peculiar color is permanently a favorite, there will always be found some pleasing association which the people have with that color, and of which they in some measure consider it as significant.

It is further observable, that no colors, in fact are beautiful, but such as are expressive to us of pleasing or interesting qualities. All colors obviously are not beautiful, for the same colors are beautiful only when they are expressive of such qualities, and in general I believe it will be found, that among all the variety of color we are acquainted with, those only are beautiful which have similar expressions. The common colors, for instance, of many indifferent things which surround us; such as the earth, stone, wood, etc., those have no kind of beauty externally, and are never mentioned as such. The things in themselves are so indifferent to us, that they excite no kind of emotion, and of consequence, their color produce no greater sensation, as the signs of such qualities, than the qualities themselves. We take our ideas of beautiful colors from the great. Thus the color of common furniture never seems beautiful to us; it is

the colors only of fashionable, or costly, or magnificent articles which are ever considered as such. It may be observed also, that no new color is ever beautiful until we have acquired some pleasing association with it. This is peculiarly observable in the article of dress, and indeed it is the best instance of it, because in such cases, no other circumstance intervenes by which the experiment can be influenced. Most people must have observed, that, in the great variety of new colors which the caprice of fashion is perpetually introducing, no new color appears beautiful at first sight. We feel on the contrary a kind of disappointment when we see such a color in the dress of those who regulate the fashions, instead of that which used to distinguish them; and even although the color should be such as in other subjects we consider as beautiful, our disappointment still overbalances the pleasure it gives. A few weeks, even a few days, alter our opinion; as soon as it is generally adopted by those who lead the public taste, and has become of consequence the mark of rank and elegance, it immediately becomes beautiful. This, it is observable, is not peculiar to colors that in themselves may be agreeable, for it often happens that the caprice of fashion leads us to admire colors that are disagreeable, and that not only in themselves, but also from the associations which they are connected. If the faculty by which the beauty of colors is perceived had any analogy to a house, it is obvious that such variations in our opinion of their beauty could not take place.

When the particular associations we have with such colors are destroyed, at the same time. Rose color, for instance, is a more rich and beautiful color than that of mahogany, yet if any man were to paint his doors and windows with rose color, he would certainly not add to their beauty. The color of a polished steel grate is agreeable, but is in itself not very beautiful; suppose it painted green, or violet, or crimson, all

of these colors much more beautiful; and the beauty of it is altogether destroyed. The colors of cedar, and of Spanish mahogany, and of satin-wood, are not nearly so beautiful as many other colors that may be mentioned. There is no color, however, with which such woods can be painted, that would be so agreeable as the colors of the woods themselves, because they are very valuable, and the colors are in some measure significant to us of this value. A ray of light refracted by a glass prism is decomposed into seven rays, red, orange, yellow, green, blue, indigo, and violet. Each of these rays is less refrangible, as it is nearer to the red. This ray is of all others, that which strikes the eye with the greatest force, and produces on the retina the liveliest impressions. The eagerness of savages for stuffs of this color is known; it is the most brilliant and splendid of all.

In nature the colors of all the plants are seen to harmonize, let there be ever so many different sorts grouped together: which is produced by the reflection of the color of one plant upon another by the light from the sky; which, whether it is morning, noon, or evening, equally sheds its influence over all nature's productions, and invigorates them with life. Nothing is crude or has a sameness in the colors of nature; even the same plant has different degrees of color, light, and shade; but all is soft, agreeable, and harmonious.

A MRS. SIMPSON, of Toledo, has invested in the lumber business. She is a widow, and can therefore do as she pleases without "let or hindrance," as the lawyers say. She not only attends personally to her own buying and selling, but owns a canal-boat, goes into the woods, purchases trees standing, hires her men, and does it all in the regular way. She does not ask for advance payments, but when her contracts are fulfilled, "cash down" is her rule.

ENGLISH ARCHITECTURAL ERRORS.

IT is characteristic of Englishmen, when dealing with artistic questions, to frequently ignore propriety and circumstance, in carrying out their desires for reproducing forms of art which are admirable in other climates and countries for other purposes. Thus their windy hills and bleak moors are studded with "Italian" Villas; their smoky cities enriched with buildings which offer costly carvings to the destructive air and its deposits of soot. It was but the other day, at a tremendous outlay, they finished in granite the parapets of the Thames embankment, and wrought them, not in the grave manner of the Egyptians when dealing with the same material, or what would have been best, in a simple form of Gothic character, but with the elaborate, angular and manifold mouldings of one of the noblest phases of Gothic art, which were wisely adapted for soft stone only. Thus both money and labor were uselessly squandered.

London is rife with just such architectural blunders. A good arch and a tolerable colossal statue were spoiled by being brought together at Hyde Park Corner. Having once got them there, and the blunder being transparent to the most inexperienced observer, they obstinately keep together, what if apart would be ornaments, to form eyesores. An almost incredible sum was spent on the façade of the British Museum, and a Colonnade erected which darkens one of its most important galleries. Trafalgar Square and the National Gallery, were spoiled by sticking in a small space in the middle of its large area, a column which would have been an example of bad art anywhere, but fatal where it is. Instances of such lamentable defective judgment are almost innumerable.

ROOM VENTILATION.—Sashes should be always double hung. This gives a chance to raise and let the fresh air in; and also lower and let the foul air out.

SEWERS.—The ancient Romans seem to have been far in advance of the moderns in respect to sanitary regulations, for they took especial pains to secure those two great necessities of urban life, an abundant supply of water and efficient drainage. Covered drains, or sewers of great magnitude and of solid construction, still exist under the streets of some ancient Roman cities, and the cloacæ or sewers of Rome are of such vast size, that some writers have supposed them to be the remains of a city more ancient than that of Rome. In modern times the sewers of London are unrivalled for extent and excellent construction; and although they are not equal to the wants of a vast and constantly increasing population, yet, when we come to consider fairly the difficulties of the case, it may excite surprise that so much has been done, and so well, within a comparatively short period. It is much more easy to point out defects in the existing system, than to suggest a remedy that shall work as well in practice as it reads well on paper. For instance, we are told, and the fact is undoubted, that the drainage of a large town, which is poured to waste into the river which passes through it, poisoning the waters and rendering the air pestilential, would, if properly distributed over its banks, bestow upon them unbounded fertility. But when we consider that the excrementitious matters produced by each individual, may amount to an annual quantity equal to one ton in weight, and that the other matters included under house sewage and street drainage, may amount to a similar quantity, we have thus a total equal to two tons per annum for every individual of the population.

UNDERMINED BY RATS.—An old market building fell recently in Brooklyn, N. Y., because the rats had undermined it. Concrete foundations are free from such accidents.

SKEW ARCHES.

THERE are few subjects which should commend more of the attention of the scientific constructor, than that of the nature and construction of skew arches. Nor is it exclusively to the engineer they belong; the architect should be conversant with them, and whether in architecture or engineering, it is the interest of the builder to understand them thoroughly.

The skew arch, in a greater degree than any other, increases its difficulty with its span; and that difficulty is great from the very springing. A recent issue of that talented publication, *Engineering* contains a letter from David Cunningham of Dundee, Scotland, in which he says;

"If we consider the nature of the curved surface formed by a skew arch, we shall find that the pressure caused by a superincumbent weight situated at the center of arch is distributed in all directions through the arch according to the angles formed by the arch on either side with a horizontal plane. In fact the arch as it becomes very skew approximates to something similar to, but worse than, a dome unsupported on two of its quarters. Therefore in a very skew arch, there will be a great thrust outwards by the interior and higher parts of the arch, upon the faces, which of necessity are much lower for a considerable part of the span. If the mortar be very strong, the strain will be diverted and will only twist the piers; if it is weak, the arch must fall, the disruptive force being too great for the excessive power of materials and workmanship.

"Skew arches, however scientifically developed, are beyond certain moderate limits dangerous."

A NEW marble has been discovered in the Giant Mountains of Bohemia, which is described as in every way equal to Carrara, both in whiteness and fineness of grain, and invaluable for sculpture.

RUSTING OF IRON.—Dr. Calvert, a fortnight ago, communicated to the Chemical Society some very useful information on the rusting of iron. Rust is mainly sesquioxide of iron, and it has always been supposed that the active agents in producing it are moisture and oxygen. It seems, however, from Dr. Calvert's experiments, that carbonic acid must be associated with these to produce any considerable amount of oxidation. In dry oxygen iron does not rust at all; in moist oxygen but little and seldom; but in a mixture of moist carbonic acid and oxygen, iron and steel rust very rapidly. In like manner a piece of bright iron placed in water saturated with oxygen rusts very little; but if carbonic is present as well, oxidation goes on so fast that a dark precipitate is produced in a very short time. Curiously enough bright iron placed in a solution of caustic or carbonated alkali does not rust at all. These facts show that the points to be attended to in the preservation of iron from rust, are the exclusion of carbonic acid and moisture, two indications which may be very easily fulfilled.—*Chemical News*.

A FLOOR CLAMP.—House carpenters throughout the country will be thankful we think, for a recently patented invention of a clamp for the securing of boards in position on a floor, preparatory to nailing them down. This new clamp is peculiar, and seems to be very effective. It is composed of a dog, having a biting and sliding tooth or stud, for grasping the opposite sides of a joist, to this dog is pivoted an adjusting bearing-plate, and a wedge forced between this bearing plate and the edge of the plank. The permanent tooth of the dog is forced into the joist by the backward pressure of the wedge on the bearing-plate, and the slipping of the sliding stud or tooth, render the grip of the clamp tight on the joist.

LEGAL CLAIMS OF ARCHITECTS.

WE take from the *Real Estate and Building Journal* of Chicago, the following report of a civil suit recently decided in the Circuit Court of that city, which cannot fail of being interesting to many of our readers, as showing what the law demands of architects to enable them to justly claim their fees.

"The case of Thomas Tilly *vs.* Daniel R. Brant occupied four or five days in the Circuit Court last week, finally resulting in a judgment for plaintiff of something over eleven hundred dollars.

"The evidence in the case was interesting, the defense undertaking to prove that the architecture was faulty and bad—so much so as to involve the loss of a large amount of money in repairs, remodeling, and the impossibility of obtaining a tenant for his theater, located on Dearborn street, and known as the Dearborn Theatre.

"It was a petition to declare and enforce an alleged mechanics' lien upon the theater and the lot upon which it has been erected. Plaintiff claimed \$9,000 for services as architect and superintendent. Defendant claimed that in both capacities he was deficient; in the one incompetent, and in the other dilatory. In proof of both they allege that the seats were so badly constructed that over a hundred of them were so arranged that the sitting visitors were precluded from all sight of the stage.

"The Court instructed the jury that if petitioner was employed by the defendants as architect of the theater, and to superintend the carpenter work of it, and no bargain was made as to the amount which should be paid for his services, then he should receive what his services are reasonably worth, less any amount which may have been paid him, and less, also, any damages which defendants sustained by reason of de-

fective construction of the building. If in this matter Tilly being sued by a creditor, and defendants being brought in as garnishees, Tilly would not be absolutely foreclosed by his oath denying that defendants owed him money, but if without reading or fully comprehending the same, upon representations made by Brant or his son, that the affidavit or answer was merely a statement that nothing was due to him (Tilly), at the time of the garnishee process, and would not affect his right to claim any remainder of compensation due at the completion of the theater, and if George W. Brant, as a lawyer, so advised him, and he, relying upon the statement, swore to the affidavit without intention to commit a falsehood, then he should not be prejudiced by the act, and it does not bind him when he claims compensation from defendants. As to the other branch of the case, defective workmanship, defendants must show some material defect in the design and construction of the building, by which it was lessened in value, which defections were not acquiesced in by defendants. And although at the time of commencing the building it was expected that it would cost not to exceed \$35,000, yet, if the defendants materially increased its cost by ordering more costly material and workmanship, also increasing thereby the value of petitioner's services, then, in the absence of an agreement, plaintiff would be entitled to the increased compensation, and he would not be responsible for defects resulting from Brant's own instruction as to the work.

"But if petitioner agreed that his compensation should not exceed \$1,500, then he is bound by his contract. So, also, if he agreed to superintend the carpenter work and conditioned that all the seats should be good, but did not superintend it, and the seats were not properly con-

structed, then these facts may be considered in determining what his services were actually worth, or, indeed, if they were really worth anything. If he had received already \$1,000, and his services were worth no more, then he should not recover.

"The jury returned a verdict for \$1,150 as above stated."

LAYING DOWN A LAWN.

THERE are many of our readers who are interested in the practical solution of this question. Many have failed to secure perfection in their lawns, and therefore we take pleasure in extracting the following valuable observations of a friend and former contributor who writes to the *Horticulturist*:

"Referring to Prof. Eastman's unfortunate failure in his efforts to produce a fine lawn by the usually successful method of sowing grass seeds, I beg to remark that, having been somewhat extensively engaged in this business for many years, I have found no difficulty whatever in the matter.

"Of course it is essential that the soil should be thoroughly prepared, whether it is to be covered with sod or sown with seed; the preparation is alike in either case. To cover several acres with sod is a very expensive operation, and in very many cases quite impracticable; obnoxious weeds, such as garlic, etc., are frequently introduced with sod, which, after all, does not make so perfect and satisfactory a lawn as a proper admixture of selected seeds.

"I find the following mixture to produce the most perfect permanent lawn:

"One bushel Red Top (*Agrostis vulgaris*).
Two bushels June grass (*Poa pratense*).
One quart Timothy (*Phleum pratense*).
Two pounds White clover (*Trifolium repens*)."

"These quantities to be mixed and applied to each acre of land.

"A lawn sown the last week of March of the present year, has already been twice mown, and is now a well set, thick sod.

WILLIAM SAUNDERS."

STONE MARBLES AND HOW THEY ARE MADE.—The chief place for the manufacture of "Marbles" is at Oberstein, on the Fahe, in Germany, where there are large agate mills and quarries, the refuse of which is carefully turned to good paying account, by being made into small balls employed by the experts to knuckle with, which are mostly sent to the American market. The substance used in Saxony is a hard, calcareous stone, which is broken into blocks nearly square by blows with a hammer. These are thrown by the one hundred or two hundred into a small sort of mill, which is formed of a flat stationary slab of stone, with a number of concentric furrows upon its face. A block of oak, or other hard wood, of the same diametric size, is then placed over the small stones and partly resting upon them. This block or log is kept revolving while water flows upon the stone slab. In about fifteen minutes the stones are turned to spheres, and then being fit for sale are henceforth called "marbles." One establishment, containing only three of these rude mills, will turn out fully sixty thousand "marbles" in one week. Agates are made into "marbles" at Oberstein by first chipping the pieces nearly round, with a hammer, handled by a skillful workman, and then wearing down the edges upon the surface of a large grindstone.

A PATENT has been issued to Thomas Donano, of New York city, on a new contrivance for securing pivoted slats in the frames of window blinds. The invention has for its object a more secure fastening for the slats, and, at the same time, greater facility for removing the same for repair.

SEYMOUR HUGHES, of Hudson City, N. J., has patented an invention which has for its object the construction of plates of metallic roofing in such a manner that the joints formed between them may be entirely water tight.

CORRESPONDENCE.

It must be distinctly understood that we do not hold ourselves accountable for the opinions of our correspondents.

San Francisco, May 23, 1870.

EDITOR OF THE ARCHITECTURAL REVIEW.

SIR: Your article on page 628, Vol. 2 and No. 2, in regard to the "Thickness of Mortar Joints," does not meet my views of the subject, at least that part of it in which you say the making of good mortar is among the "lost arts," for I contend, that any bricklayer of the present day, who has ever given the matter any consideration and research, can prepare as good mortar in every particular, as ever was prepared in mediæval age; but I do not wish to be understood by this assertion to say, that they *do* make mortar in their constructions of the present day, as good, as what it could be made; the reason they do not, is plain to the dullest mind; in fact the competition that a person has to compete with to secure a contract, coupled with the false notions of owners in regard to getting work done cheap, causes them, after having taken a contract at a low price, to use all expedients to curtail expenses, and in the point of mortar alone, a great saving may be made. You may say the architect would detect any fraud in the matter; but in all the time I have been working at my trade, I never yet saw an architect who could detect wherein lay the imperfections of the mortar; but still there are some architects who do understand the subject, but where we meet those who do not, we take care not to enlighten them. In regard to mortar used in constructions in this city, like every other part of America (for I have worked in all sections), it is as a general thing but an apology for mortar; then again what little good there may happen to be in it, is very often destroyed before the structure is finished by the manner of using it, and all through the effects to save

the dollar on the part of the contractor. No practical mechanic in this city, but will say that it is a wonder that we do not have more buildings fall on account of earthquake than does, but I might write page after page on this subject. I know that you do not care to be bothered too much, and I will close by stating one other cause of bad mortar, and that is the ignorance of the person having charge of the masonry. In regard to their trades, for as I said in a former part of my letter, those brick layers and stone layers, who had given the matter of mortar making some study, are the only persons who are able to make mortar equal to the mortar of the mediæval age. Now those who do not study their trade are by far the largest number, and among those, I think I may class the person who superintends the construction of the United States Branch Mint, in this city, for his process of laying the brick totally destroys the adhesiveness of the cement he is using. He is having the brick wet with water previous to laying them, and they are so wet that when laid on the mortar or cement, the water by gravitation descends from all parts of the brick to the joint on the bed through which it percolates, carrying down with it the most of the particles of a concretion nature, leaving nothing in contact with the *bottom* of each brick but a bed of sand, with not half the spaces between the particles filled, what the spaces were filled with, has been deposited underneath the sand by the water, and then the particles coating the top of the brick underneath, closes the pores and compels the water to find its way out on top of it, washing out the particles of hydraulic lime and cement, and down the face of the wall, which the most unpracticed person can observe.

Now what adhesiveness can there be in mortar that has had its very life washed out in this manner? I suppose I could find many other faults in the work, if I was to go over it closely, but this one instance of where a structure, belonging to a great nation, is entrusted to a person who shows no more knowledge in regard to mortar than this one does, is sufficient to explain one of the reasons why men of the present, do not find mortar in all qualities, the equal of mortar of ancient times. That bricks should be wet previous to laying, I do not deny, but not wet in the manner in which they are at this Branch Mint. Now, as I think I have trespassed rather long on your time, I will let the subject drop; but you must not think I have exhausted all which I could say on the subject of mortar, for I have made a study of it since I became a

PRACTICAL BRICKLAYER.

Worcester, Mass.

From our special Correspondent.

THERE are now in process of construction, in the city of Worcester, Mass., a place of about 40,000 inhabitants, seven blocks, which when finished will furnish accommodations to sixteen additional traders. In addition to these there are also building one hundred and seventy-five dwelling-houses, costing from three to ten thousand dollars each.

The present building enterprises are not so many as those of 1869, and on the whole not of as costly construction. Yet, in completeness and architectural adornment, they will compare favorably with those of any previous year.

Worcester, as a general thing is built of wood. One cause of this is the absence of good brick clay, either in the city or immediate vicinity. All good bricks are procured by rail-transportation of from sixteen to fifty miles. There are many bricks made in the city, however, from a very strong hard pan. These brick are of an excellent cherry red color, when well burned, but lack

strength and smoothness; and are not susceptible of being readily cut with trowel, usually fall into fragments under the operation of turning.

A fire limit ordinance has lately been established, forbidding the erection, within the defined lines, of any wooden structures in which fire is to be used, for any purpose. The legality of this ordinance is now being tested in the courts.

MR. EDITOR:—You have given from time to time in your excellent pages, a great deal of interesting information to the building community, both amateur and professional, and as I know your desire is to make the REVIEW as widely useful as possible, I would ask of you to let your readers have some articles on the subject of "building stones," their several histories, nature, properties, and adaptability to construction. You once observed that there was a lamentable lack of knowledge of this subject among architects and builders; and knowing such to be the fact why not present the required information in your pages?

Architects too often select for construction of their designs, stone that is wholly unfit for the location or the purpose; hence we see exfoliation and decay in the walls of many fine structures which have cost large sums of money, and which a little understanding of the relative properties of stones might have obviated.

I am sure sir, that by giving more attention to this subject you will benefit many of your readers, as well as your subscriber.

A BUILDER.

We are happy to be able to respond to the very sensible request of our correspondent, and to assure him that the subject of "Building Stone" shall receive the most particular attention on our part; and to this end we have been fortunate in securing the scientific assistance of Professor Charles P. Williams, whose first paper appears in this number of the ARCHITECTURAL REVIEW, and whose pen will in future treat our readers

to a profitable course of instructive essays on many subjects besides; all connected with our speciality, and rendered in a popular as well as comprehensive style.

And here we may say that we will feel indebted to any of our readers who will make suggestions, or state their wants of information, and we will endeavor to meet them as fully as possible. The mission of the ARCHITECTURAL REVIEW is to disseminate knowledge in a field heretofore strangely neglected, and in doing so we naturally look around for those friendly hints which serve to guide us on our course of usefulness.

EDITOR OF THE ARCHITECTURAL REVIEW.

It is pleasing to see what an interest is growing up throughout this country in Architecture. The natural consequence of such a progress of public taste on this subject is a rapid increase of the number of professors of this chief of the Fine Arts. I make use of the term "professors" advisably, for alas, there are many who are "only that and nothing more." It is sad to think on the amount of mischief which it is in the power of these mere professors to do. Knowing their own want of ability, they will accept of anything as compensation for their services; and their deluded employers will thus be led to believe that they are worthy of patronage, on account of their "very reasonable charges." Of course, not knowing the true value of the "services rendered." If the REVIEW could devise any mode of guarding the legitimate profession against such "quacks," it would confer a favor on all.

ARCHITECTUS.

Boston, June 16, 1870.

ANSWER.—We know of but one way for the profession to vindicate itself in this matter; and that is to stand shoulder to shoulder in the adoption and unwavering support of the schedule of fees, resolved on by the Institute of American Architects at its last year's session. The public will soon learn to value the ser-

vices of all who *underbid* for the sake of obtaining patronage, which they could not otherwise expect to gain. The architect who thoroughly understands his profession, is justly entitled to the compensation agreed upon by his brethren, and is bound in honor to take that, and nothing less.

EDITOR OF THE ARCHITECTURAL REVIEW.

DEAR SIR: Will you please inform me through the columns of the REVIEW, if coloring can be made with hard finish, or the last coat of Plaster of Paris and lime used in ordinary plastering, and if so, the process of mixing and applying. Also the best method of coloring ceilings.

And oblige, A SUBSCRIBER.

Mix the desired color with diluted size, and with this work up the plaster. Take care to make your color very strong, as the action of the lime lightens it.

MR. EDITOR.—In the London *Builder*, just received (June 25th), I find a long communication on the utilization of the heat that usually passes away in chimneys, signed "John Whiting, M. D., (Member of the Royal College of Physicians, London,)" which will strike American readers as most extraordinary, in view of the fact that the principle very ingeniously descanted on by the scientific and utilitarian writer, is one that has been thoroughly acted on for the past forty years in this country. The Doctor *proposes* to convey the heat of fire to rooms over and in the rear of it by pipes. Our "dumb stove," has been engaged in that service, a very long time. The Baltimore heater is a refinement on the dumb-stove, as it is a neat enclosed grate, with ornamental panels of isinglass, the heat from it is transmitted by a metallic flue to a similar grate in the room over it. But, why intrude on your space further than to invite the Doctor to pay a visit to this land of notions, to see what is old before he dreams of new. NEW ENGLAND.

QUERIES AND RESPONSES.

A. H., Stratford, Ontario, Canada.—There is or should be nothing to dread from the severest frost affecting the eaves of flat roofs covered with tarred felt or paper. All is in the *mode* of constructing the eaves. Make the gutter as shallow as possible (a flattened out V), and give it a good current or fall by keeping it well up on the roof at one end and close to the edge of the eave at the other. Now set up a strip against the edge of the eave, and rising four inches above it. Take care in finishing to cover this fender strip well with your tarred material, lapping that of the gutter well on it. At the lower end of the gutter have your shoot, which should be funnel shaped, and carefully connected with the down pipe on the outside wall. Never use a hanging, or bracketted eaves gutter; for it is not as effective as the roof-gutter, just described, and is subject to the destructive force of the wind.

In order to ensure a weathertight eave it is only necessary to return the tarred material carefully under the roof boarding to the ends of the rafters, and then nail on your cornice carefully. If this be done in a workmanlike manner there will be no inlet for the weather; and the rain water or melted snow, having no chance for lodgment, cannot freeze.

It is, in nine cases out of ten, the carelessness of workmen in closing up under the eaves, that cause the leakages and other disagreeable effects which go so far towards injuring the reputation of this water-proof roofing.

H. S., New Britain, Conn.—The difficulty you complain of, namely: "The crumbling of the mortar-joints in chimney tops," is one that is but too common throughout the country. We everywhere see chimney shafts whose tops are rapidly crumbling to decay, owing to the destructive action of the smoke of our

coal on the brick and mortar. This can only be avoided by using cement for the joints of the brickwork, and coating the whole with silicate of soda (soluble glass). Thus the pernicious acid which lodges on the brickwork, is prevented entering the porous material and the shaft is thus defended from mischief.

S. L.—If you wish to save your lumber so as to use again after putting up a temporary building, such as that you speak of, use screws instead of nails, and dip each screw, before driving it, in raw linseed oil. You can do the same with nails; but the screws are better, for their hold is more secure and they will not split the stuff, as nails too often do. Besides, the screws are so easily drawn.

ENQUIRER asks if the *tower* is an essential part of the church?

We answer—architecturally, it is; ecclesiastically it is not. The tower is to all intents and purposes a construction of utility, being originally intended for and even now used as an elevated point from whence to call the faithful to prayer. It is a main feature in the external design; but is not essentially necessary to the purposes of religious exercises.

This question gave rise to a warm newspaper discussion in Buffalo, N. Y., some years ago, in consequence of the chiming of bells just placed in the tower of St. Paul's Episcopal Church in that city, being made to peal forth during week-day practice, such airs as "Pop Goes the Weasel," "Yankee Doodle," etc. The gentleman who presided at the bells replied to the objections, and argument, response, and rejoinder followed each other in fast succession. One side inveighed against the practice, as a scandalous desecration of the whole sacred edifice; the respondents stoutly denied that the church proper was con-

cerned in, or accountable for the acts done in the tower, although the clock thereon should falsify Time itself.

The argument was dropped, but left in a most undecided state.

STUDENT.—You are not obliged to adopt the style of design which prevailed in the architect's office you learned in. Read, think, and invent for yourself. Otherwise you will be a copyist and unoriginal.

WE often receive requests from subscribers to purchase and forward to their address, various drawing-instruments, books, etc. With every desire to oblige, we, nevertheless, must decline all such commissions; for the simple reason that we could not spare the time. By looking over our advertisements all persons in want of such matters, can find the address of an optician, or a bookseller, to whom a request made would be at once attended to.

PUBLICATIONS.

SCIENTIFIC.

THE NEW ELEMENTS OF HAND-RAILING: By ROBERT RIDDELL. Philadelphia: Claxton, Remsen & Haffelfinger. London: Sampson, Low & Co.

Like Mr. Riddell's previous works, this is truly practical; and so clear and simple that it requires little or no knowledge of Geometry to perfectly master the subject heretofore looked upon as so difficult. Forty accurately engraved plates, drawn to scale, distinctly illustrate the problems, and we speak from the card when we say that the stair-builder will find in this treatise all that he can require. The demand for it on both sides of the Atlantic is very great, and will increase as its sterling merit becomes known. We strongly recommend *The New Elements of Hand-Railing*, as the best book of its class in use.

THE TECHNOLOGIST.—This latest addition to our American scientific serials is really worthy of the wide spread patronage we understand it is receiving; and we find, by our foreign exchanges, that it is well received in Europe, as well as here at home. This is a pleasing proof of the complimentary fact that American scientific information is deemed worthy of especial notice in the very stronghold of sound knowledge, founded on an experience very far beyond the limit of that of a young nation like ours. Civil Engineering is the leading speciality of this comprehensive periodical, and on that subject it is already an authority. But the *Technologist* does not confine itself to a few subjects, its field of thought, as its name would import, is wide and well cultivated. The numerous illustrations are well worthy of the excellence of the letter-press; and the whole leads us to wish it an infinite continuation of the success it has already so deservedly won.

THE SCIENTIFIC AMERICAN.—Our hale old friend is as full of good cheer as ever, unterrified by the fearful opposition brought to bear upon his long and faithfully held position as a monitor and adviser in practical scientific matters. The *Scientific* has just closed another volume, and opened a new.

THE LAND OWNER.—This well posted and admirably got up Chicago publication presents a full quota of building news each month, and gives its friends a very desirable *melange* of readable matter.

THE REAL ESTATE JOURNAL is one of Chicago's weeklies that treats of building matters, and thereby helps on the progressive movement of the day. There is a close tie of consanguinity (so to speak) between the two subjects "Land, or Real Estate, and Building," and it is pleasing to see it appreciated, and the relationship so liberally acknowledged.

THE HORTICULTURIST for July contains very interesting matter. This publication is edited with energetic ability, and affords a fund of useful information on the subjects of importance to those who desire to cultivate to advantage their ground, their fruits and flowers, that should be in the hands of every citizen.

THE AMERICAN EXCHANGE AND REVIEW.—Always able, ever instructive, and intelligent on every subject connected with history, statistics, chemistry, and general scientific subjects. This monthly well deserves all its success.

THE WORKSHOP is a New York monthly republication, of a splendidly illustrated European journal of art progress.

LITERARY.

LITTELL'S LIVING AGE, notwithstanding the recent loss of its esteemed founder, shows the same discriminate taste in its selections which was engrafted in it by him, and has made it what it is, first among the select.

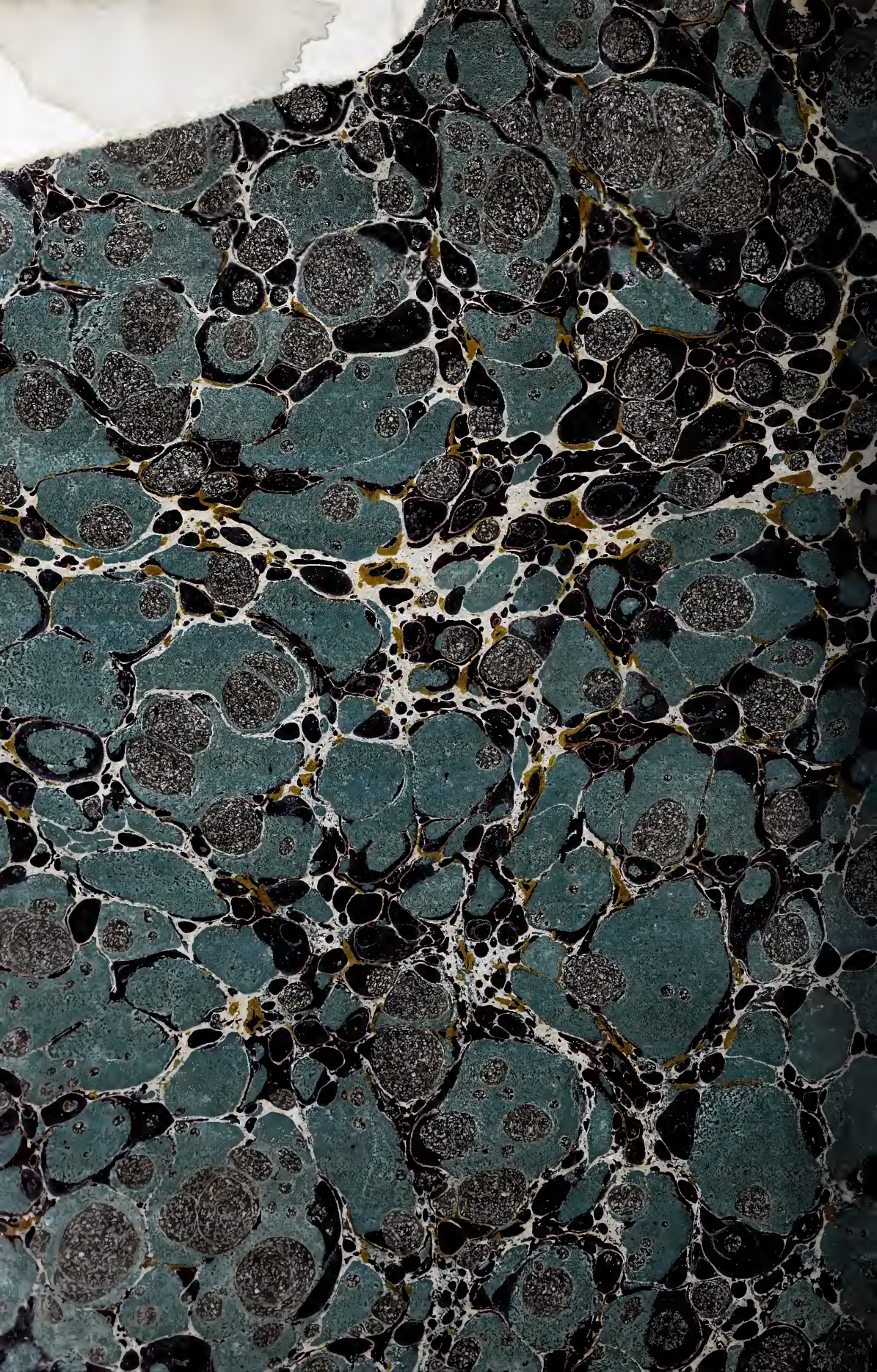
OLD AND NEW.—It augurs well for the growing spirit of chaste yet spirited monthly literature, that this new enterprise is growing steadily into favor. We wanted just such a serial; and so far the want is promptly met.

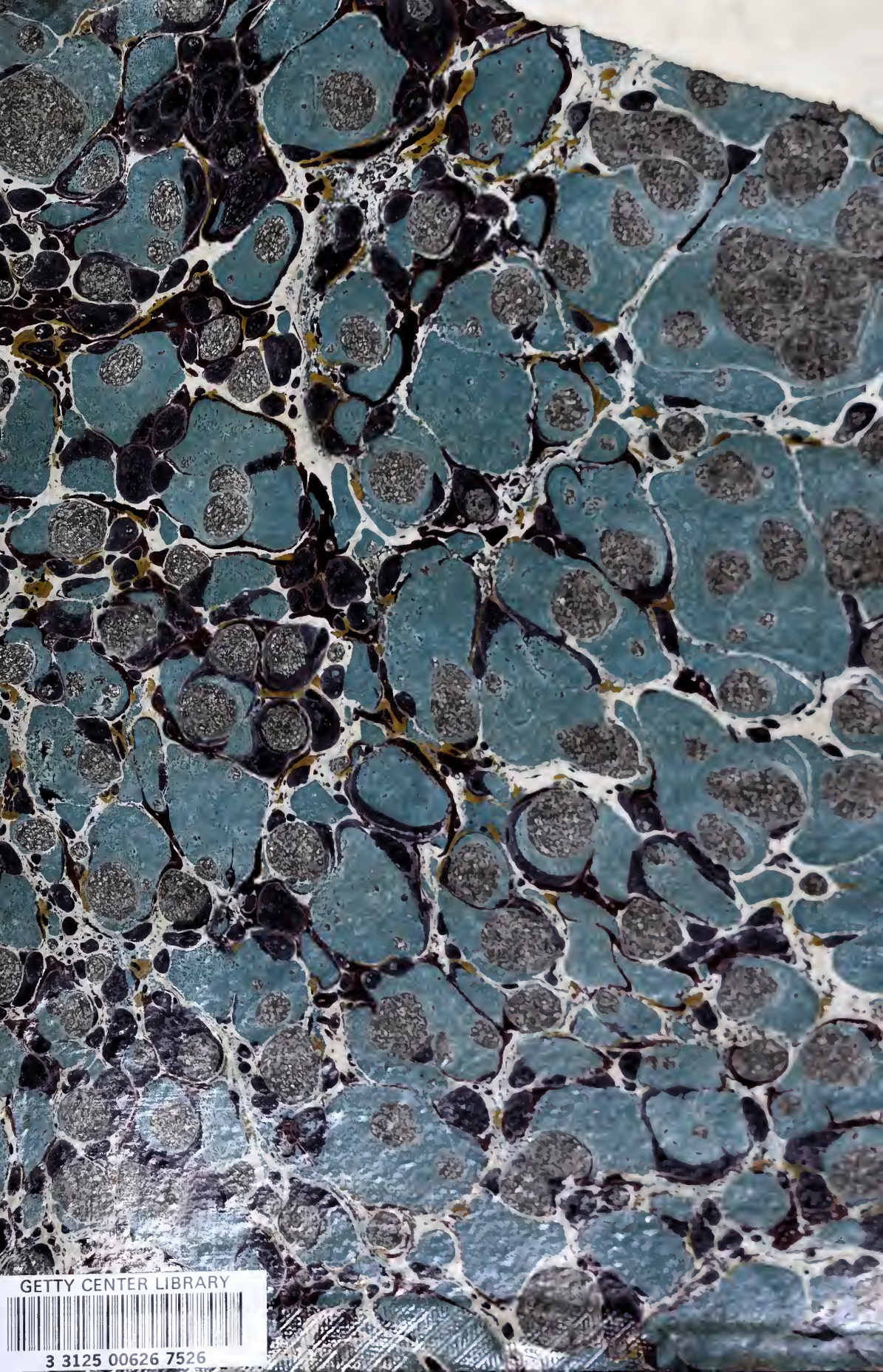
THE PENN MAGAZINE.—No. 7 of this collegiate serial, a literary emanation of our University, has but a few papers, but they are of value as sound, scholarly, and attractive contributions to American literature, which go conclusively to prove that *alma mater* is not a silent sister.

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